

CHAPTER 16 TRANSPORTATION

**FINAL
ENVIRONMENTAL
IMPACT STATEMENT**

**Brightwater
Regional Wastewater
Treatment System**

VOLUME 3

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Chapter 16

Transportation

16.1 Introduction

This chapter addresses the affected environment, impacts to the environment, mitigation measures, and significant unavoidable adverse impacts related to transportation for the proposed Brightwater System. Figures and a list of references are at the end of the chapter.

16.1.1 Chapter Overview

This chapter has been updated since publication of the Draft EIS, based on comments raised by federal and local agencies, Washington State Department of Transportation (WSDOT), Washington State Ferries (WSF), Snohomish County, cities and towns along the project's conveyance routes, and citizens. Specific updates and additional analyses conducted to address these comments are summarized below.

Portal Sites. An analysis of each potential portal site is provided for each conveyance route.

Construction Activity. The construction activity, schedule, and resulting construction traffic are analyzed for the peak construction period of 2007 for both treatment plant sites and for the portals. (In the Draft EIS, peak construction was analyzed in 2010.)

Construction Sequence. Construction staging, work schedule, shifts, and project trip generation at both plant sites and the portals have been updated to reflect a more realistic sequencing process.

Impacts of State Route (SR–9) Improvements. The traffic impacts analysis along SR-9 has been updated to provide a comparison with and without the proposed SR-9 improvements.

Parking at the Unocal Site. Recommendations are made for remote parking lots for construction workers at the Unocal site.

Potential Conflicts with Ferry Traffic. Recommendations are made for remote truck holding areas for construction at the Unocal site to minimize conflicts with ferry traffic.

Concurrency Analysis. A transportation concurrency analysis was conducted in compliance with the Snohomish County Unified Development Code, Section 30.66B, for occupancy of the treatment plant at the Route 9 site. (Refer to Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, for this analysis.)

Planned Developments. A transportation analysis was performed for impacts related to planned developments, including concurrent construction and subsequent operation of a Costco warehouse near the Route 9 site and Edmonds Crossing on the Unocal site.

This chapter summarizes the relevant findings and conclusions of all of the transportation analyses conducted for the Brightwater project. A brief discussion of applicable regulations and the methods used for analysis is provided to give the reader context for the discussion of impacts. The analysis of significant impacts and reasonable mitigation measures is provided in summary form in the chapter, while detailed descriptions of the evaluations and results are included in Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, and Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance. The concurrency study was conducted according to Section 30.66B of the Snohomish County Unified Development Code. Because the methodology used is unique to Snohomish County, the analysis results may vary for the same roadway segment or intersection analyzed. Snohomish County uses average travel speed along arterial units, computed from the Synchro traffic modeling software, to determine level of service (LOS) for roadways under its jurisdiction. Where applicable (year 2010 operations for the Route 9 site), a comparative result from the concurrency analyses is presented in this document.

16.1.2 Road Naming Conventions

State routes (such as SR-522) and federal routes (I-5, I-405) are referred to in this chapter by their route numbers. Local and collector roads without route designations are called by their local names. The state routes also have local names, which correspond to the state route numbers as follows.

SR-9. This is the “Route 9” that runs by the Brightwater Route 9 site. It begins at SR-522 northeast of Bothell and parallels I-5 north to the Canadian border. In the project area it is known as the Snohomish-Woodinville Road.

SR-99. This is the old US 99, or Pacific Coast Highway. It runs north-south through the project area. In King County it is called Aurora Avenue N; in Snohomish County, simply Highway 99.

SR-104. In the project area, SR-104 runs from Edmonds Ferry Terminal east on Main Street, south and southeast on Sunset Avenue S, thence southeast along Edmonds Way, part of NE 205th St, and Ballinger Way NE. It ends at Lake Washington, where it meets SR-522. (NE 205th is King County’s name for the street that marks the county line; Snohomish County calls it 244th Street SW.)

SR-522. SR-522 enters the project area from the south as NE Bothell Way in King County. At the Wayne Golf Course, west of the city of Bothell, it turns north and changes its name to Bothell Way NE. In Bothell, SR-522 turns east on Woodinville Drive, then becomes the Bothell-Monroe Highway. It ends outside the project area at SR-2 in the city of Monroe.

SR-524. SR-524 starts in Edmonds east from SR-104 on Main Street at Sunset, then turns north on 3rd Avenue N, east on Caspers Street, north again on 9th Avenue N, then east again on Puget Drive. It continues easterly as 196th Street SW, Filbert Road, and 208th Street SE. Past SR-527 it becomes Maltby Road and continues east to end at SR-522 in the town of Maltby.

SR-527. This route is generally known as the Bothell-Everett Highway. Its southern end is in Bothell where Bothell Way NE turns north after meeting Woodinville Drive. Outside the Bothell city limits, Bothell Way NE changes its name to Bothell-Everett Highway and runs north to the city of Everett.

Throughout this chapter, directional elements of road names are abbreviated N, S, E, W, NW, NE, SW, SE, NB (northbound), WB (westbound), etc.

16.2 Affected Environment

This section describes the elements of the local and regional transportation system that could be affected by construction and operation of the Brightwater Treatment Plant, conveyance system, and outfall. These elements include the existing local roadways, state routes, and interstate highways; transit service; key bicycle and pedestrian routes; passenger and freight train service; and (where applicable) marine traffic.

Information on existing conditions was collected from published sources and site visits. Traffic and safety analyses were performed using methodologies consistent with the latest (year 2000) edition of the *Highway Capacity Manual* (HCM2000) (Transportation Research Board, 2000), with reference to the *Manual on Uniform Traffic Control Devices* (MUTCD) (FHWA, 2001), the Institute of Traffic Engineers (ITE) *Traffic Engineering Handbook* (ITE, 1999), the WSDOT Design Manual (WSDOT, 2002b), and standards of the American Association of State Highway and Transportation Officials (AASHTO, 2001).

16.2.1 Affected Environment Common to All Systems

16.2.1.1 Regulatory Environment

Transportation facilities fall under the jurisdiction of a number of public entities. Local governments (towns, cities, and counties) plan and regulate traffic on most streets within their boundaries, except those under state control. Local governments also plan for and regulate non-motorized transportation facilities in their jurisdictions, such as bicycle paths. WSDOT is responsible for traffic regulation, access, and easements for state highways and interstate freeways.

The U.S. Coast Guard regulates marine vessel traffic in Puget Sound; activities within navigable waters require Coast Guard permits to ensure noninterference with other marine activities. The Coast Guard has established maritime traffic lanes for vessels in Puget Sound. The eastern boundary of these lanes is approximately 10,000 feet offshore from Point Edwards and 7,500 feet offshore from Point Wells. Recreational vessels use the waters of Puget Sound throughout the project area.

Train traffic is regulated by the Federal Railroad Administration, which dictates acceptable speeds and has established track and signal standards. Railway companies own rights-of-way (ROWs) on the rail system and have established procedures for permitting activities by other agencies within these ROWs. In the project area, these companies include Amtrak for passenger service and the Burlington Northern-Santa Fe (BNSF) railroad for freight.

Bus transit in the project area is provided by Sound Transit, King County Metro Transit, and Community Transit.

Roadways are described by the regulatory agencies in terms of “functional classifications,” also called “roadway classifications.” These classifications denote categories of roadways that serve different purposes and are designed under different standards. Each jurisdiction or agency may use its own set of classifications to describe the roadways in its jurisdiction. General categories identified by AASHTO (2001) include the following.

Local roads and streets. These carry relatively low volumes of traffic and serve local land uses such as residential areas.

Collector roads and streets. These collect traffic from local roads and streets and funnel it to arterial roadways; these typically have higher traffic volumes than local roadways.

Rural and urban arterials. These carry relatively high volumes of traffic and primarily serve regional needs (e.g., providing routes to regional commercial centers and other high-activity destinations).

Freeways. These are limited-access roads: access is gained only through interchanges, and no other driveways or cross streets intersect the highway. Freeways are used for long-distance travel and carry high traffic volumes.

16.2.1.2 Level of Service (LOS) Standards

The level of service (LOS) rating is one of the main tools that jurisdictions use to measure traffic operating conditions. LOS is assigned under guidelines used by transportation professionals to indicate the overall degree of delay and congestion associated with specific roadways or intersections. LOS definitions (Table 16-1) have been established by the National Academy of Sciences Transportation Research Board (Transportation Research Board, 2000). The general public considers LOS A, LOS B, LOS C, and LOS D—ranging from free-flowing traffic to relatively long delays—to be acceptable. LOS E is considered to be the limit of acceptable delay. LOS F, characterized by extreme traffic congestion, is undesirable and warrants consideration of improvements to increase roadway capacity.

Table 16-1. Level of Service (LOS) Definitions^b

LOS	Average Delay (seconds per vehicle [s/v]) ^a	Traffic Flow Characteristics
Signalized Intersections		
A	≤ 10	Most vehicles arrive during the green phase and do not stop at all.
B	> 10 - ≤ 20	More vehicles stop, causing greater delay.
C	> 20 - ≤ 35	Vehicle stopping is significant, but many still pass through the intersection without stopping.
D	> 35 - ≤ 55	Many vehicles stop. The influence of congestion becomes more noticeable.
E	> 55 - ≤ 80	Very few vehicles pass through without stopping.
F	> 80	Considered unacceptable by most drivers. Intersection is not necessarily over capacity although arrivals exceed capacity of lane groups.
Unsignalized Intersections		
A	≤ 10	Few or no traffic delays.
B	> 10 - ≤ 15	Short traffic delays.
C	> 15 - ≤ 25	Average traffic delays.
D	> 25 - ≤ 35	Long traffic delays.
E	> 35 - ≤ 50	Very long traffic delays.
F	> 50	Queuing on minor approaches and not enough gaps of a size to allow safe crossing of major streets. Signalization should be investigated.

Table 16-1. Level of Service (LOS) Definitions^b (cont.)

LOS	Average Delay (seconds per vehicle [s/v]) ^a	Traffic Flow Characteristics
Roadway Segments		
A	90%-100%	Free flow. Vehicles are completely unimpeded in ability to maneuver in the traffic stream. Delay at signalized intersections is minimal.
B	70%-89%	Operation is reasonably unimpeded at average travel speeds. Ability to maneuver in the traffic stream is only slightly restricted, and delay at signalized intersections is not significant.
C	50%-69%	Roadway operates at a stable level; however, ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds for the given street class.
D	40%-49%	Borders on a range where small increases in flow may substantially increase delay and decrease travel speed. LOS D may be due to adverse signal progression, poor signal timing, high volume, or a combination of these factors.
E	33%-39%	Significant delays. LOS E may be due to a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and poor signal timing.
F	< 33%	Characterized by urban street flow at extremely low speeds for the given street class. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and long queues.

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

^b LOS definitions and methodologies established by the National Academy of Sciences Transportation Research Board; differences from local jurisdiction assumptions may occur
Source: Transportation Research Board (2000)

Under the Washington State Growth Management Act (GMA) of 1990, as amended, local governments are required to set acceptable LOS limits for all locally owned arterials and transit routes. Each jurisdiction in the urban growth area decides on the level of traffic congestion it will accept—as measured by LOS—and adopts this standard as part of the transportation element of its comprehensive plan. When a permit for a project is applied for, the jurisdiction determines whether the project’s impact would degrade LOS below the adopted standard in affected parts of the transportation system. If it would, the jurisdiction has the authority to either deny the permit or require the developer to commit to, or pay for, transportation improvements or strategies to mitigate the impacts. According to the GMA, such improvements must be completed “concurrent with the development,” which in this case is defined as within 6 years.

Jurisdictions in the Brightwater project area differ in how they designate an acceptable LOS rating. Most of the affected jurisdictions (WSDOT and the Cities of Edmonds, Shoreline, Lake Forest Park, and Bothell) have adopted LOS A through D as acceptable. The Cities of Mountlake Terrace and Brier and the Town of Woodway have adopted a higher level (LOS C), while the Cities of Kenmore and Woodinville and King and Snohomish Counties accept a lower level (LOS E) for most roadways. Snohomish County accepts LOS C as a threshold for rural roads.

In general, LOS standards are applied only to traffic generated by the operation of a proposed project. Construction traffic impacts are regulated through conditions placed on development permits and through the State Environmental Policy Act (SEPA) process. Such conditions could include the designation of specific haul routes for construction truck traffic, carpooling or busing arrangements for construction workers, and restoration of roads damaged by heavy truck traffic. Certain impacts are also subject to transportation impact fees authorized under the GMA.

16.2.1.2 Trip Distribution

Truck traffic and haul impacts were assessed using the truck types and construction methods assumed for the conveyance and treatment sites. The estimates were provided by URS, Inc., and are documented in the separately bound “Supplemental Traffic Information”; they can be reviewed at King County. The analysis identifies proposed access to construction sites and roadways used to route truck traffic during construction and operations.

A truck trip was defined for this analysis as a one-way trip inbound or outbound; therefore, a round trip was counted as two trips. The daily construction trips, as provided in Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall, are broken down into four categories as shown below:

Earthwork Trucks. These are based on a standard truck-and-trailer combination (with five or more axles) with an estimated capacity of 16 cubic yards per truck. It is assumed that some of the excavated materials can be stored onsite and hauled away at a relatively steady rate over the duration of earthwork activities.

Concrete Trucks. Quantities were calculated for each scheduled concrete activity, and the required concrete was totaled on a monthly basis. Average daily trips are based on the quantities needed to meet scheduled monthly totals. The number of trucks is based on delivery of 9 cubic yards per truck. This allows about a 10 percent factor for overages, which is common in the industry.

Material Delivery Trucks. Each scheduled construction activity was reviewed, and materials required for that activity were estimated. Truck trips were based on past experience with similar construction projects. Although material delivery vehicles would vary widely over the course of the project, a typical delivery is considered to be a truck-and-trailer unit with a 40-foot trailer or flatbed.

Personnel Vehicles. Usage of these vehicles is based on projected manpower requirements over the course of the project. Vehicle counts are based on an average vehicle occupancy of 1.3 persons, which is consistent with region-wide occupancy rates, and the typical vehicle is a four-passenger automobile.

All heavy vehicles were subject to passenger car equivalencies (PCEs) for analytical purposes.

A single-unit truck was counted as 2.0 vehicles, and any truck with five or more axles was counted as 4.0 vehicles. These data were combined with background traffic forecasts to find a cumulative intersection operation LOS and worst-case impacts to roadway capacity at the study locations in the afternoon peak hours.

The distribution of construction truck traffic assumes designated truck access routes for the construction sites to the interstate freeway system.

Estimates of construction trips and operational employee trips were developed to assess short-term and long-term impacts of employee travel. Assumptions about mode share (i.e., the proportion of trips using transit, carpool, vanpool, walking, or bicycle travel) were applied to determine the actual number of personnel vehicle trips generated during both construction and ongoing operations. An employee trip was defined as a single employee traveling one way in an inbound or outbound vehicle.

Employee trips were applied to background and construction truck traffic forecasts to determine a cumulative intersection LOS and impacts to roadway capacity during the afternoon peak. The distribution of employee traffic was based on existing traffic patterns at the study roadways and intersections. Employee traffic has specific starting and ending times based on scheduled work shifts.

Peak traffic hours were determined from 24-hour weekday traffic counts performed for the critical roadway segments and peak-hour intersection vehicle turning movement counts at the study intersections. Existing traffic data are documented in the separately bound “Supplemental Traffic Information” document and can be reviewed by contacting King County.

Both morning (a.m.) and afternoon (p.m.) peak-hour traffic volumes were reviewed; it was determined that for most of the study area, the p.m. peak-hour volumes (typically between 4:00 p.m. and 6:00 p.m.) represent the worst-case traffic operating conditions. Thus only the p.m. data were fully analyzed; the a.m. data were analyzed only for specific locations where the morning volumes were considerable. Generally, the a.m. peak volumes were 84 percent of the p.m. along SR-522, 90 percent along SR-9, and 73 percent along SR-104.

16.2.2 Affected Environment: Route 9 System

16.2.2.1 Treatment Plant: Route 9

The Route 9 site lies along SR-9 in an unincorporated portion of south Snohomish County (Figure 3-3, Chapter 3). The site is bordered by SR-9 to the west and SR-522 to the south and east. Primary vehicle access would occur at the SR-9 and 228th Street intersection. Secondary access from an additional driveway, south of 228th Street, would

be provided along SR-9. A series of roads would be built onsite to provide internal vehicular access to all major unit treatment processes and related buildings.

Transportation systems in the vicinity include local and regional roadways, a BNSF rail line, and pedestrian and bicycle facilities.

Roadways in the vicinity range from residential neighborhood streets to major regional highways. The roadways evaluated as having the potential to experience adverse impacts associated with Brightwater are SR-9, SR-522, and 228th Street SE. Detailed descriptions of the characteristics of the roadways and intersections are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Traffic Volumes

Existing traffic volumes were obtained from Snohomish County for SR-9 roadway segments studied. Existing average weekday traffic (AWDT) on SR-9 is roughly 24,000 vehicles per day (both directions combined) on the segment between 228th Street SE and SR-522. The AWDT on 228th Street SE is estimated at 5,500 vehicles per day west of SR-9 and 19,000 east of SR-527. The volume during afternoon (p.m.) peak hours for potentially affected SR-9 segments in the vicinity of the Route 9 site is approximately 2,400 vehicles per hour.

Roadway Level of Service

Potentially affected SR-9 segments, north of SR-522, in the vicinity of the Route 9 site have a current LOS rating of F, which is unacceptable based on the WSDOT operations threshold. The 228th Street segments, between SR-9 and SR-527, generally operate well at LOS B/C levels. However, some sections of 228th, as well as SR-9, regularly experience long traffic queuing delays at unsignalized intersections and driveways accessing local pockets of residential/business developments. This is due to a lack of median turn storage and acceleration lanes and/or heavy volumes of truck traffic. Improvements along 228th Street are planned by Snohomish County and WSDOT, and west of SR-9, 228th Street SE is classified by Snohomish County as a critical arterial unit in arrears. According to DPWR 4210(V)(A), an arterial is considered to be in arrears if it currently exceeds or is forecast within 6 years to exceed the adopted LOS standard for rural arterials, which is LOS C.

Intersection Level of Service

Five key intersections in the vicinity of the Route 9 site were analyzed to determine existing traffic conditions. Table 16-2 summarizes the results. All five intersections are under WSDOT jurisdiction, which has an LOS D threshold for acceptable operations. All

study intersections currently operate at LOS D or better, with the exception of SR-9/SR-524 which operates unacceptably at LOS E.

**Table 16-2. Route 9 Site Vicinity—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^a	LOS
SR-9 at 228th Street SE	41	D
SR-527 at 228th Street SE	50	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (Unsignalized)	20	C
SR-9 at SR-524	69	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data for three years, 1999 through 2001 (Bernard, personal communication, 2003), were reviewed for the affected segments of SR-522 and SR-9 in the vicinity of the Route 9 site. Accident rates were measured as accidents per million vehicle miles (MVM). Two separate rates were determined, one for the total accidents occurring along the roadway and one for all accidents not occurring at intersections. Intersections that had a high number of accident occurrences were also noted. This analysis allowed identification of safety deficiencies along the roadways and at intersections. Table 16-3 summarizes the findings. As shown on the table, the statewide average is 2.97 accidents per MVM and this is exceeded on one segment of SR-522.

Table 16-3. Route 9 Site Vicinity—Accident Analysis

Route/Segment	Total Accidents		Non-Intersection Accidents	
	Number	Rate ^{a,b}	Number	Rate ^a
SR-522				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03
SR-9				
236th Street SE to 228th Street SE	77	2.93	49	1.86

^a Measured as accidents per million vehicle miles (MVM)

^b Statewide rate is 2.97 accidents/MVM (principal arterials in urban areas)

Source: Bernard, (personal communication, 2003)

According to the WSDOT data, approximately one-third of the accidents that occur away from intersections involve vehicles entering or exiting driveways. This high rate of occurrence can possibly be attributed to limited driveway sight distance and high traffic travel speeds. These factors, combined with a high number of access points and heavy

volumes on arterials like SR-522, suggest a greater occurrence of potential vehicle conflicts. All of these factors are common contributors to accidents on arterials.

Table 16-3 shows that a substantial number of the accidents in the site vicinity occur at intersections. The following intersections were identified as major contributors to the total number of accidents in the Route 9 site vicinity:

- SR-522 at 61st Avenue NE
- SR-522 at 68th Avenue NE
- SR-522 at 73rd Avenue NE
- SR-522 at 80th Avenue NE
- SR-9 at 228th Street SE

Parking

Designated on-street parking in the vicinity of the Route 9 site does not exist, other than several sections of shoulder that are wide enough to park a vehicle.

Truck Traffic

Truck traffic along SR-9 in the vicinity of the Route 9 site is between 4 and 7 percent of total vehicle usage. Truck traffic comprises 10 percent of total daily vehicle usage along SR-522 in the vicinity of the Route 9 site, and between 2 and 4 percent of the afternoon peak-hour traffic along 228th Street SE. Truck traffic data were obtained from the 2002 WSDOT Annual Traffic Report (WSDOT, 2003) and the traffic counts performed for this study. The data are documented in the separately bound “Supplemental Traffic Information” and can be reviewed at King County.

Transit

Transit service is not provided directly to the Route 9 site.

Pedestrian and Bicycle Circulation

Pedestrian and bicycle travel in the vicinity of the Route 9 site are currently accommodated along paved and gravel shoulders. There are no designated bicycle routes in the vicinity. There is a programmed WSDOT project, the “SR 9, SR 522 to SR 524 Widening” project (WSDOT, 2002a) that would provide 8-foot shoulders (usable by bicyclists) and some sidewalks on either side of SR-9. The Snohomish County

Comprehensive Plan also shows planned non-motorized facilities along SR-524, 228th Street SE, 180th Street SE, Broadway Avenue, and the North Creek trail from the county line to Mill Creek.

Other Transportation Modes

Major airports near the Route 9 site include Paine Field, approximately 8 miles to the north, which serves the Boeing Company's commercial airplane operations and some general aviation operations. The nearest international airport is Seattle-Tacoma International Airport, located in the City of SeaTac, approximately 30 miles to the south. The BNSF railroad operates a track immediately east of the Route 9 site. This is a lightly used branch line connecting to the BNSF main line in the south at Tukwila, and in the north near the City of Snohomish.

16.2.2.2 Conveyance–Route 9

Route 9–195th Street Corridor

Two conveyance corridors are being considered for the Route 9 site. Both include an influent conveyance system that would follow the same course for both the 195th Street and 228th Street conveyance corridors. The influent tunnel would follow 68th Avenue NE to NE 195th Street, then turn east at 195th to Portal 44. The alignment then runs east along NE 195th Street through Portal 41 to SR-522, and then north to the Route 9 site. The alignment follows street rights-of-way wherever possible.

The effluent conveyance for the 195th Street corridor would parallel the influent conveyance corridor, south along SR-522 from the Route 9 site and then west along NE 195th Street to Portal 44. From Portal 44, the 195th Street effluent conveyance tunnel continues in 195th Street right-of-way on its extensions until it reaches Portal 7 (Ballinger Way); from there it aligns with SR-104, veering northwest to Portal 5 and then continuing due west to its termination at Portal 19, near outfall zone 7S. Major access routes for conveyance corridor construction in this alternative would be I-5, SR-522, SR-104, 228th Street SE, and I-405.

Portals along the conveyance corridors are designated either primary or secondary. Primary portals are those required for tunnel construction. Secondary portals are not expected to be constructed, but might be needed for temporary ventilation, ground improvement, and/or supply of backfill grout. Requirements for secondary portals would be based on geotechnical information obtained and reviewed during detailed design. If required, secondary portals would be located along the conveyance corridors at intervals of approximately 10,000 feet from primary portals.

Final portal sites within the identified portal siting areas have not yet been selected.

Roadway System

The major access routes for construction of the Route 9 influent and the 195th Street effluent corridor option would include I-5, SR-522, SR-104, 228th Street SE, and I-405. Detailed descriptions of the characteristics of the roadways and intersections are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Traffic Volumes

The existing p.m. peak-hour and AWDT volumes for SR-522, SR-104, and 228th Street SE are shown in Figure 16-1.

Roadway Level of Service

Existing p.m. peak-hour LOSs for urban street segments along the 195th Street corridor are summarized in Table 16-4. Four segments currently operate at unacceptable levels, LOS E/F. These are SR-104 west of I-5, SR-522 east of SR-104, and SR-9 north of SR-522, under WSDOT jurisdiction; and NE 195th Street east of I-405, under the jurisdiction of Bothell.

**Table 16-4. Route 9–195th Street Corridor^a—
Existing Segment P.M. Peak-Hour Levels of Service**

Roadway	LOS
SR-104 west of Interstate 5	E
SR-104 south of 15th Avenue NE	C
SR-99 south of SR-104	C
SR-99 north of SR-104	C
SR-522 east of SR-104	F
SR-522 west of SR-527	C
NE 195th Street east of Interstate 405	E
228th Street SE west of SR-9	C
228th Street SE east of SR-527	B
SR-9 north of SR-522	F

^a The ratings are the same for the 228th Street corridor

Intersection Level of Service

Several intersections along the 195th Street corridor access routes were evaluated (Table 16-5) to determine existing traffic conditions. The existing LOSs for these intersections range from acceptable (D or better) to poor levels needing improvement (F). The intersections of SR-104/15th Avenue NE, SR-522/SR-527, and SR-9/SR-524 currently operate at an unacceptable LOS of E during afternoon peak traffic. SR-104/SR-522 operates at an unacceptable LOS F. The four study intersections operating at unacceptable levels are all along state routes.

**Table 16-5. Route 9–195th Street Corridor—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v)^a	LOS
SR-99 at SR-104	52	D
SR-104 at I-5 Southbound Off-ramp	29	C
SR-104 at 15th Avenue NE	59	E
SR-104 at SR-522	190	F
SR-522 at SR-527	67	E
SR-9 at 228th Street SE	41	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (Unsignalized)	20	C
SR-9 at SR-524	69	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data for 1999-2001 (Bernard, personal communication, 2003) were reviewed for the SR-522 and SR-104 segments of the 195th Street corridor. Accident rates were determined the same way as for the treatment plant site, as described above under Treatment Plant. Table 16-6 summarizes the findings.

According to the WSDOT data, the majority of accidents occur at intersections, and approximately one-third of the non-intersection accidents occur while entering or exiting driveways. The following intersections were identified as major contributors to the total:

- SR-522/SR-104
- SR-522/61st Avenue NE
- SR-522/68th Avenue NE
- SR-522/73rd Avenue NE
- SR-522/80th Avenue NE
- SR-104/100th Avenue West
- SR-104/Meridian Avenue North

Table 16-6. Route 9–195th Street Corridor^a—Accident Analysis

Route/Segment	Total Accidents		Non-Intersection Accidents	
	Number	Rate ^{b,c}	Number	Rate ^b
SR-9				
236th Street SE to 228th St SE	77	2.93	49	1.86
SR-104				
SR-522 to I-5	237	3.86	98	1.60
I-5 to SR-99	139	1.61	62	0.72
SR-99 to 100th Avenue W	120	3.24	44	1.19
SR-522				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03

^a The accident analysis is the same for the 228th Street corridor

^b Measured as accidents per million vehicle miles (MVM)

^c Statewide rate is 2.97 accidents/MVM (principal arterials in urban areas)

Source: Bernard, (personal communication, 2003)

Parking

On-street parking is not allowed along critical roadway segments that would be used for access, including: SR-522, 68th Avenue NE, NE 195th Street, 120th Avenue NE, North Creek Parkway, SR-104, SR-99, N 185th Street, and NW Richmond Beach Road.

Truck Traffic

Truck traffic along SR-522 within the potentially affected segments makes up approximately 10 percent of the daily traffic volume (WSDOT, 2003). The surrounding area is primarily industrial, accounting for the relatively high truck percentage.

Transit

Both Sound Transit and King County Metro provide service along SR-522 between the cities of Seattle, Kirkland, Redmond, Bellevue, Woodinville, Bothell, Kenmore, Lake Forest Park, and Shoreline. Metro provides day-long local and peak-hour express service, while Sound Transit provides regional express service focused toward peak-hour commuters. King County Metro also provides service along SR-104 between the Cities of Shoreline and Lake Forest Park and the east side of Lake Washington, with stops at transfer points to Seattle and Everett.

Pedestrian and Bicycle Circulation

Sidewalks along Bothell Way are intermittent; other areas have paved shoulders for pedestrians to walk. The Burke-Gilman Trail is a regional bicycle facility that parallels Bothell Way, then transitions to the Sammamish River Trail toward the east of I-405.

Primary Portals

Final portal sites within the identified portal siting areas have not yet been selected. The portal siting areas for the 195th Street corridor are shown in Figure 3-5 in Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 11

There are three candidate sites (A, B, and C) for Portal 11 (see Figure 3-26). Site A can be accessed directly via 68th Avenue NE or NE 175th Street. Site B can be accessed directly from NE 175th Street. Site C can be accessed directly from 68th Avenue NE or NE 181st Street.

The proposed construction traffic route to all of these portal sites begins on I-405 and continues west on SR-522. Access for Sites A and B continues south on 68th Avenue NE and west on NE 175th Street. Access to Site C continues north on 68th Avenue NE and west on NE 181st Street. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-522/68th Avenue NE (signalized)
- SR-522/SR-527 (signalized)
- 68th Avenue NE/NE 175th Street (signalized)
- 68th Avenue NE/NE 181st Street, northern T (signalized)
- 68th Avenue NE/NE 181st Street, Rite-Aid driveway (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting at approximately 5:00 p.m. and heavy vehicles making up 1 percent or less of the traffic stream.

Level of Service

The City of Kenmore Comprehensive Plan (dated March 2001) LOS threshold for intersections north of the Sammamish River is LOS E. All intersections within this portal study area are north of the Sammamish River. The WSDOT standard for intersections is LOS D for routes under state jurisdiction. The study intersections currently operate at LOS E or better (Table 16-7) with the exception of SR-522/68th Avenue NE, which operates below the acceptable threshold at LOS F, and the intersection of SR-522/SR-527, which operates at LOS E. Both are under state jurisdiction.

**Table 16-7. Route 9–195th Street Corridor^a, Portal 11—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^b	LOS
SR-522 at 68th Avenue NE	103	F
SR-522 at SR-527	67	E
68th Avenue NE at NE 175th Street	16	B
68th Avenue NE at NE 181st Street, northern T	9	A
68th Avenue NE at NE 181st Street, Rite-Aid driveway	13	B

^a Portal 11 values are the same for the Route 9–228th Street and Unocal corridors

^b Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 44

There are three candidate sites (C, D, and E) for this portal location (Figure 3-41). Site C can be accessed via separate private driveways that extend eastbound from the intersection of 80th Avenue NE and NE 195th Street. Site D can be accessed via separate private driveways that extend eastbound from the intersection of 80th Avenue NE and NE 195th Street. Site E can be accessed directly from NE 195th Street.

The proposed construction route to all three of these portal sites begins on I-405, continues west on SR-522, then runs north on 80th Avenue NE to NE 195th Street. With proposed construction along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-522/SR-527 (signalized)
- SR-522/80th Avenue NE (signalized)
- 80th Avenue NE/NE 195th Street (unsignalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed that the peak period starts between 4:30 and 5:00 p.m. Heavy vehicles comprise less than 2 percent of the traffic stream. Directional traffic flow is heavier southbound on NE 80th Street and eastbound on SR-522.

Level of Service

The Kenmore LOS threshold for intersections north of the Sammamish River is LOS E, and all intersections within this portal study area are north of the Sammamish River. The WSDOT standard for intersections under state jurisdiction is LOS D. All of the study intersections currently operate at LOS E or better (Table 16-8). The intersection of SR-522/SR-527, which is under state jurisdiction, operates at LOS E.

**Table 16-8. Route 9–195th Street Corridor^a, Portal 44—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^b	LOS
SR-522 at SR-527	67	E
SR-522 at 80th Avenue NE	49	D
80th Avenue NE at NE 195th Street	18	C

^a Portal 44 values are the same for the 228th Street corridor

^b Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 41

There are six candidate sites (A, C, D, J, W, and X) for this portal location (Figure 3-40). Sites A, C, and J can be accessed from NE 195th Street. Site D can be accessed from 120th Avenue NE. Site W can be directly accessed from Beardslee Boulevard and Ross Road. Site X can be accessed from North Creek Parkway.

The proposed construction route to portal sites A, C, D, J, and X begins on I-405 and continues east on NE 195th Street, then south on 120th Avenue NE (Sites C/D) or on North Creek Parkway (Sites A, J, and X). The proposed construction route to portal site W begins on I-405 and continues west on NE 195th Street to Beardslee Boulevard, then west on Ross Road. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- I-405 northbound ramp/NE 195th Street (signalized)
- I-405 southbound ramp/NE 195th Street (signalized)
- NE 195th Street/North Creek Parkway (signalized)
- NE 195th Street/120th Avenue NE (signalized)
- Beardslee Boulevard/Ross Road (unsignalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting between 4:15 and 5:00 p.m. and heavy vehicles making up 2 percent or less of the traffic stream. Directional traffic flow is heavier westbound on NE 195th Street. For 120th Avenue NE it is evenly distributed in both directions.

Level of Service

The LOS values for Portal 41 are shown in Table 16-9. The City of Bothell and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). Both of the I-405 ramp intersections with NE 195th Street and the Beardslee Boulevard/Ross Road intersection operate at an acceptable level,

LOS C. The intersection of NE 195th Street at North Creek Parkway also operates at an acceptable level, LOS D. The City of Bothell's 195th Street/120th Avenue NE intersection operates below acceptable standards at LOS E.

Table 16-9. Route 9–195th Street Corridor^a, Portal 41—Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (s/v) ^b	LOS
I-405 Northbound Ramp at NE 195th Street	31	C
I-405 Southbound Ramp at NE 195th Street	23	C
NE 195th Street at North Creek Parkway	46	D
NE 195th Street at 120th Avenue NE	77	E
Beardslee Boulevard at Ross Road	19	C

^a Portal 41 values are the same for the 228th Street corridor

^b Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 5

There are three candidate sites (X, B, and G) for this portal location (Figure 3-23). Site X can be accessed directly via SR-104 or 15th Avenue NE. Site B can be accessed directly via SR-104. Site G can be accessed directly via SR-104.

The proposed construction route to any of these portal sites begins on I-5 and continues east on SR-104 to the intersection with 15th Avenue NE. With proposed construction along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-104/15th Avenue NE (signalized)
- SR-104/I-5 southbound off ramp (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements, collected in 1995 by WSDOT, were adjusted to existing 2003 conditions with a 1 percent per year growth factor to evaluate the existing traffic conditions in the portal study area. The peak traffic period begins at approximately 5:15 p.m. The eastbound traffic volumes during the peak are consistently higher than the westbound at all of the study intersections.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations, is LOS D. During the p.m. peak hour, SR-104/15th Avenue NE operates below WSDOT acceptable levels at LOS E with an average delay of 59 seconds per vehicle (s/v). SR-104/I-5 southbound off-ramp operates acceptably at LOS C, 29 s/v.

Portal 5 values are the same for the Unocal corridor.

Portal 19

Three candidate sites (A, C, and E) were evaluated for this portal location (Figure 3-30). All three sites can be accessed directly via Richmond Beach Drive NW, a minor arterial as classified by King County. Additional screening conducted since the Draft EIS has resulted in the identification of C as the preferred site for Portal 19.

The proposed construction route to any of these three sites begins on I-5, then goes to SR-104, then south on SR-99 to N 185th Street, and continues west to NW Richmond Beach Road, NW 195th Street, and NW 196th Street to Richmond Beach Drive NW. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-99/N 185th Street (5-legged signalized)
- NW Richmond Beach Road/8th Avenue NW (5-legged signalized)
- NW 196th Street/Richmond Beach Drive NW (unsignalized)

Traffic Volumes

For most of the study area, the afternoon peak-hour volumes represent the worst-case scenario. Morning data were analyzed only for specific locations where the morning volumes were considerable. In the Portal 19 vicinity, both morning and afternoon peak-period intersection turning movements were collected in 2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hours starting between 7:30 and 8:00 a.m. and 4:00 and 4:45 p.m., respectively. Heavy vehicles made up 2 percent or less of the traffic stream for both peak periods. Directional traffic flow is heavier southbound on Richmond Beach Drive and eastbound on NW 196th Street, NW Richmond Beach Road, and N 185th Street in the morning. The direction of heavy traffic flow reverses between morning and afternoon.

Level of Service

Table 16-10 shows the LOS values for a.m. and p.m. peak hours for Portal 19. The City of Shoreline and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). The study intersections currently operate at LOS D or better during both the a.m. and p.m. peaks with the exception of the SR-99/N 185th intersection. This intersection, which is under WSDOT jurisdiction, operates at LOS E in both peak periods.

**Table 16-10. Route 9–195th Street Corridor^a, Portal 19—
Existing Intersection Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^b	LOS
A.M. Peak Hour		
SR-99 at N 185th Street	56	E
NW Richmond Beach Road at 8th Avenue NW	34	C
NW 196th Street at Richmond Beach Drive NW	9	A
P.M. Peak Hour		
SR-99 at N 185th Street	78	E
NW Richmond Beach Road at 8th Avenue NW	35	C
NW 196th Street at Richmond Beach Drive NW	9	A

^a Portal 19 values are the same for the 228th Street corridor

^b Includes deceleration time, stopped time, and acceleration time due to intersection controls

Secondary Portals

Final secondary portal sites within the identified portal siting areas have not yet been selected. Secondary portals are not expected to be used. The secondary portal siting areas for the 195th Street corridor are shown in Figure 3-5 of Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 45

There are three candidate sites (A, C, and D) for this secondary portal (Figure 3-42). Sites A and C can be accessed directly via 55th Avenue NE. Site D can be accessed directly from NE 193rd Street or NE 190th Street.

The proposed construction route to all of these portal sites begins on I-405 and continues west on SR-522. Access continues north on 61st Avenue NE and west on NE 190th Street or NE 193rd Street to 55th Avenue NE. With proposed construction traffic along the aforementioned streets, the following study intersections are analyzed in this chapter:

- SR-522/SR-527 (signalized)
- SR-522/80th Avenue NE (signalized)
- SR-522/68th Avenue NE (signalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected during 2003 to evaluate the existing traffic conditions in the portal study area. The p.m. peak period on SR-522 begins at approximately 5:00 p.m. Volumes on SR-522 near 61st Avenue NE are slightly heavier westbound, and heavy vehicles make up 1 percent or less of the traffic stream.

Level of Service

The WSDOT standard for roadway operations along Bothell Way NE, which has been assumed for intersection operations as well, is LOS D. Table 16-11 shows the intersection operations. The intersections of SR-522 with SR-527 and 68th Avenue NE both operate at unacceptable levels during the p.m. peak hour, at LOS E and F respectively. Delays at 80th Avenue NE are slightly lower, resulting in acceptable LOS D conditions.

**Table 16-11. Route 9–195th Corridor, Portal 45—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^a	LOS
SR-522 at SR-527	67	E
SR-522 at 80th Avenue NE	49	D
SR-522 at 68th Avenue NE	103	F

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 7

There are three candidate sites (A, B, and C) for this secondary portal (Figure 3-24). All three can be accessed directly from 25th Avenue NE via SR-104. The proposed construction route to these portal sites begins on I-5 and continues east on SR-104 to the intersection with 25th Avenue NE. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-104/25th Avenue NE (signalized)
- SR-104/15th Avenue NE (signalized)
- SR-104/I-5 southbound off-ramp (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were assembled from available WSDOT traffic data and supplemented with 2003 traffic counts. Traffic volumes at several of the WSDOT data collection locations were adjusted to 2003 conditions using a 1 percent per year growth factor to evaluate the existing traffic conditions in the portal study area. The p.m. peak hour begins at approximately 5:15 p.m. and was characterized by heavier eastbound traffic flow at all of the study intersections.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Table 16-12 shows the intersection operations for the three study intersections. The SR-104/15th Avenue NE intersection operates below acceptable operating standards, at LOS E. The remainder of the study intersections operate at LOS C during the afternoon peak hours.

**Table 16-12. Route 9–195th Street Corridor^a, Portal 7—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v)^b	LOS
SR-104 at 25th Avenue NE	28	C
SR-104 at 15th Avenue NE	59	E
SR-104 at I-5 Southbound Off-ramp	29	C

^a Portal 7 values are the same for the Unocal corridor

^b Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 27

There are three candidate sites (A, B, and C) for this secondary portal (Figure 3-35). Sites A and B can each be directly accessed from SR-104. Site C can be directly accessed from 242nd Place SW.

The proposed construction route to any of these three portal sites begins on I-5 and continues west on SR-104, then north on the Nile Temple Golf Club driveway (opposite 5th Avenue NE) for Site A, south on 1st Avenue NE for Site B, and north on 76th Avenue W to 242nd Place SW for Site C. With proposed construction traffic along the aforementioned streets, the following intersection is described in this chapter:

- SR-104/I-5 southbound ramps (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were assembled from available WSDOT traffic data and supplemented with 2003 traffic counts. Traffic volumes at several of the WSDOT data collection locations were adjusted to 2003 conditions using a 1 percent per year growth factor to evaluate the existing traffic in the portal study area. The afternoon peak hour begins at approximately 5:15 p.m. and is characterized by heavier eastbound traffic flow at all of the study intersections.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. The study intersection currently operates acceptably at LOS C with an average delay of 29 s/v.

Portal 23

There are three candidate sites (A, D, and F) for this secondary portal. Sites A and D can be directly accessed from Firdale Avenue. Site F can be directly accessed from SR-104.

The proposed construction route to all of these portals begins on I-5 and continues west on SR-104 and 244th Street SW to the intersection with Firdale Avenue. With proposed construction traffic along the aforementioned streets, the following intersection is described in this chapter:

- SR-104/I-5 Southbound Ramps (signalized)

This is the same intersection that was studied for Portal 27. For volumes and LOS, see the Portal 27 discussion above.

Portal 41 Influent Pump Station Option

The IPS option, if implemented on the 195th Street corridor, would be located in the vicinity of Portal 41. For affected environment, see the Portal 41 discussion above and Table 16-9.

16.2.2.3 Route 9–228th Street Corridor

The 228th Street alternative is characterized by the same Route 9 treatment plant site and influent portion of the corridor as the 195th Street alternative. The influent pipeline would follow the same alignment as the 195th Street conveyance system, generally following 68th Avenue NE to NE 195th Street, then turning east at 195th to Portal 44. The alignment then runs east along NE 195th Street through Portal 41 to SR-522, and then north to the Route 9 site. The effluent tunnel for the 228th Street alternative runs directly west from the Route 9 site along 228th Street, veering south along 100th Avenue W and then west along N 205th Street, terminating at Portal 19. The major access routes for conveyance corridor construction unique to this alternative would be 236th Street SW, and 228th Street SW, in addition to those listed for the 195th Street corridor.

Roadway System

Route segments and that would provide access for construction vehicles are similar to the 195th Street alternative and are discussed above under Roadway System in the section titled Conveyance–195th Street Corridor. See Table 16-4 for the roadway segment LOS ratings and Table 16-6 for the accident analysis.

Intersection Level of Service

Several intersections along the 228th Street corridor access routes were evaluated (Table 16-13) to determine existing traffic conditions. The existing LOSs for these intersections range from acceptable (D or better) to poor levels needing improvement (F). The intersections of SR-522/SR-527, and SR-9/SR-524 currently operate at an unacceptable LOS of E during afternoon peak traffic. Both intersections operating at unacceptable levels are along state routes.

Table 16-13. Route 9–228th Street Corridor^a, Roadway System—Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (s/v)^a	LOS
SR-522 at SR-527	67	E
SR-9 at 228th Street SE	41	D
SR-527 at 228th Street SE	50	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (Unsignalized)	20	C
SR-9 at SR-524	69	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Primary Portals

Final portal sites within the identified portal siting areas have not yet been selected. The primary portal siting areas for the 228th Street corridor are shown in Figure 3-10 of Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 11

Portal 11 is shared with the 195th Street alternative and is discussed above under Primary Portals in the section titled Conveyance–195th Street corridor. See Table 16-7 for the intersection LOS ratings.

Portal 44

Portal 44 is shared with the 195th Street alternative and is discussed above under Primary Portals in the section titled Conveyance–195th Street corridor. See Table 16-8 for the intersection LOS ratings.

Portal 41

Portal 41 is shared with the 195th Street alternative and is discussed above under Primary Portals in the section titled Conveyance–195th Street corridor. See Table 16-9 for the intersection LOS ratings.

Portal 39

There are three candidate sites (B, C, and D) for this portal location (Figure 3-39). Sites B and C can each be accessed directly from 228th Street SW. Site D can be accessed directly from 31st Avenue SE.

The proposed construction route to any of these three portal sites begins on I-405 and continues south on SR-527, then east on 228th Street SW to the intersection of 31st Avenue SE. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- I-405 northbound ramp/SR-527 (signalized)
- I-405 southbound ramp/SR-527 (signalized)
- SR-527/228th Street SW (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002 and then adjusted to 2003 to evaluate the existing traffic conditions along the access route to the portal study area. The afternoon peak hour begins at approximately 5:00 p.m. The existing afternoon traffic volumes at the study intersections were estimated to have heavy vehicles making up 2 percent of the traffic stream. Directional traffic flow is slightly heavier westbound on 228th Street SW toward SR-527.

Level of Service

The City of Bothell and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). All study intersections currently operate at LOS D or better (Table 16-14).

Table 16-14. Route 9–228th Street Corridor, Portal 39 and Portal 37—Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (s/v) ^a	LOS
I-405 Northbound Ramp at SR-527	36	D
I-405 Southbound Ramp at SR-527	22	C
SR-527 at 228th Street SE	50	D

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 33

There are three candidate sites (A, C, and D) for this portal location (Figure 3-37). All can be directly accessed from 228th Street SW. The proposed construction route begins on I-405 and continues south on SR-527, then west on 228th Street SW to the intersection of Locust Way. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- I-405 northbound ramp/SR-527 (signalized)
- I-405 southbound ramp/SR-527 (signalized)
- SR-527/228th Street SW (signalized)
- 228th Street SW/14th Avenue West (signalized)
- 228th Street SW/Locust Way (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting at 5:00 p.m. and heavy vehicles making up less than 1 percent of the traffic stream. Directional traffic flow is slightly heavier westbound on 228th Street SW to Locust Way.

Level of Service

The City of Bothell and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). The Snohomish County standard for rural roadway operations is LOS C. All of the study intersections currently operate at acceptable levels (Table 16-15).

Table 16-15. Route 9–228th Street Corridor, Portal 33–Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (s/v) ^a	LOS
I-405 Northbound Ramp at SR-527	36	D
I-405 Southbound Ramp at SR-527	22	C
SR-527 at 228th Street SE	50	D
228th Street SW at 14th Avenue West	15	B
228th Street SW at Locust Way	12	B

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 26

There are three candidate sites (A, C, and D) for this portal location (Figure 3-34). Site A can be directly accessed from either 228th Street SW or Lakeview Drive. Site C can be directly accessed from SR-99 or 224th Street SW. Site D can be directly accessed from Lakeview Drive or 74th Avenue W.

The proposed construction route to any of these three portal locations begins on I-5, then goes west on SR-104 and north on SR-99 to portal C. The route to portal sites A and D continues east on 224th Street SW and south on 73rd Avenue W to 228th Street SW (which becomes Lakeview Drive). With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-99/224th Street SW (signalized)
- 224th Street SW/73rd Avenue West (unsignalized)
- 228th Street SW/73rd Avenue West (unsignalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting at approximately 4:30 p.m. and heavy vehicles making up 1 percent or less of the traffic stream. Traffic flow is heavier for the movements that turn away from SR-99 onto residential streets.

Level of Service

The City of Edmonds standard for roadway operations is LOS D, and the Mountlake Terrace standard is LOS C for acceptable operating conditions. The specific standard assumed for intersection operations was based on the jurisdiction of each of the study intersections. All of the study intersections operate at LOS C or better (Table 16-16).

**Table 16-16. Route 9–228th Street Corridor, Portal 26—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^a	LOS
SR-99 at 224th Street SW	32	C
224th Street SW at 73rd Avenue West	11	B
228th Street SW at 73rd Avenue West	14	B

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 19

Portal 19 is shared with the 195th Street alternative and is described above under Primary Portals in the section titled Conveyance–195th Street corridor. See Table 16-10 for the intersection LOS ratings.

Secondary Portals

Final secondary portal sites within the identified portal siting areas have not yet been selected. Secondary portals are not expected to be used. The secondary portal siting areas for the 228th Street corridor are shown in Figure 3-10 in Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 37

There are three candidate sites (A, C, and D) for this secondary portal (Figure 3-38). Site A can be directly accessed from 19th Avenue SE via 228th Street SW. Site C can be directly accessed from 228th Street SE or 9th Avenue SE. Site D can be accessed directly from 9th Avenue SE.

The proposed construction route begins on I-405 and continues south on SR-527, then west on 228th Street SW to Site C, south on 19th Avenue SE to Site A, or north on 9th Avenue SE to Site D. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- I-405 northbound ramp/SR-527 (signalized)
- I-405 southbound ramp/SR-527 (signalized)
- SR-527/228th Street SW (signalized)

These are the same intersections that are analyzed for Portal 39. See that discussion above. See Table 16-14 for the intersection LOS values.

Portal 30

There are three candidate sites (A, B, and C) for this secondary portal (Figure 3-36). Access to Site A would follow 228th Street SW, and then along a private driveway. Access to Site B would occur from either 228th Street SW or 25th Avenue W. Access to site C could occur from either 228th Street SW or 227th Street SW.

The proposed construction route to any of these sites begins on I-5 and continues east on 236th Street SW to Cedar Way. The route would continue north on Cedar Way and then east on 228th Street SW to 35th Avenue West.

This secondary portal is not along the construction routes for adjacent primary portals or the treatment plant site, thus impacts to the surrounding infrastructure are projected to be minimal. Study intersections were not identified for this location. If this portal is required, appropriate environmental review will be conducted in support of permits.

Portal 24

There are three candidate sites (A, B, and C) for this secondary portal (Figure 3-33). Sites A and C can be directly accessed from SR-104. Site B can be accessed directly via 228th Street SW from SR-104 and 95th Place W.

The proposed construction route to any of these three portal sites begins on I-5 and continues northwest on SR-104 to the intersection with 95th Place W.

This secondary portal is not along the construction routes for adjacent primary portals or the treatment plant site, thus impacts to the surrounding infrastructure are projected to be minimal. Study intersections were not identified for this location. If this portal is required, appropriate environmental review will be conducted in support of permits.

Portal 22

There are five candidate sites (A, C, D, E, and F) for this secondary portal (Figure 3-31). Site C can be accessed from 8th Avenue NW or 244th Street SW. Sites A and D can be accessed from Firdale Avenue. Site E can be accessed from 7th Avenue NW. Site F can be accessed from either 244th Street SW or 5th Avenue NW.

The proposed construction route to any of these three portal sites begins on I-5 and continues west on 244th Street SW (which for part of the way forms part of SR-104) to the intersection of 100th Avenue W. With proposed construction traffic along the aforementioned streets, the following intersection is described in this chapter:

- SR-104 and I-5 southbound ramps

This is the same intersection that was studied for Portal 27. For volumes and LOS, see the Portal 27 discussion above under Conveyance—195th Street Corridor.

Portal 41 Influent Pump Station Option

The affected environment for the 228th Street corridor IPS Option is the same as described for Portal 41. See Table 16-9 and the Portal 41 discussion under Primary Portals in the section titled Conveyance—195th Street Corridor.

16.2.2.4 Outfall—Route 9

The Chevron Richmond Beach Asphalt Terminal at Point Wells uses a deep-water dock, located immediately north of Zone 7S, to transport materials to and from the industrial facility. The dock is approximately 1,000 feet long and lies nearly parallel to the shoreline at a distance of 200 feet offshore. Frequency of maritime traffic accessing the dock is currently three to four barges per week and, on average, one tanker ship per quarter. Chevron Texaco, the owner of the terminal, currently leases dock time to one customer. The customer typically moors a 600-foot vessel at the dock once every 1 to 2 months.

Figure 3-9 in Chapter 3 shows the conceptual outfall alignments at Zone 7S. The nearest major ports are in Seattle (15 miles south) and Everett (15 miles north). Vessels using these ports include oil tankers, cargo ships, commercial fishing boats, tugs, barges, cruise ships, and naval vessels. Tribal fishery management areas and associated marine transportation activities associated with tribal fishing are discussed and shown in Chapter 7.

The land-side access to the Zone 7S outfall would be similar to the access to Portal 19. Thus, the affected environment would coincide with that of Portal 19 (please see Portal 19 discussion under Affected Environment, Conveyance—195th Street Corridor).

16.2.3 Affected Environment: Unocal System

16.2.3.1 Treatment Plant: Unocal

Under this alternative, Pine Street would be relocated to accommodate the treatment plant. Primary vehicle access to the site is from SR-104 to Pine Street (Figure 3-14). A series of roads would be built on the plant site to provide internal vehicular access to all major unit treatment processes and related buildings.

Transportation systems in the vicinity include local and regional roadways; the Edmonds ferry dock; marine shipping lanes in Puget Sound; BNSF and Amtrak railways; and pedestrian and bicycle facilities. Edmonds Crossing, a multimodal facility integrating ferry, rail, and bus service, is proposed by WSDOT and the City of Edmonds for development on the Unocal site (Bernstein and Wilbur Smith Associates, 1995). That project is under a separate environmental review and has not yet been permitted.

Roadways in the vicinity range from residential neighborhood streets to a major regional highway. The roadways potentially affected by the Unocal site alternative are Pine Street, Unocal Road, Dayton Street, and SR-104 to the I-5 interchange. Detailed descriptions of the characteristics of the roadways are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Traffic Volumes

Traffic volume data were obtained from WSDOT, Snohomish County, King County, and the Cities of Edmonds, Bothell, Brier, Kenmore, and Mountlake Terrace. The existing AWDT volumes along SR-104 are estimated to range from approximately 10,000 vehicles just north of Pine Street to 22,000 between SR-99 and Pine Street and nearly 47,000 between I-5 and SR-99 (WSDOT, 2003). The p.m. peak hour is used in transportation planning to represent the worst-case traffic conditions, which generally occur in the afternoon commute between approximately 4 p.m. and 6 p.m. Afternoon peak-hour traffic generally comprises approximately 2 percent of the AWDT. The traffic volume data mentioned above are documented in the separately bound “Supplemental Traffic Information,” which can be reviewed at King County.

Edmonds Terminal is located at the intersection of SR-104 and Main Street in the Edmonds downtown/waterfront area. Approximately three-quarters of the ferry traffic travels to and from the terminal along Edmonds Way (SR-104). The remaining 25 percent travels through downtown via 3rd Avenue S and Pine Street. Ferry access by that route is restricted during peak hours by portable barricades that are set up to accommodate long queues of vehicles waiting to board. All critical intersections along SR-104 between the terminal and I-5 have adequate capacity for current traffic volumes.

Roadway Level of Service

Generally, the roadway network around the Unocal site has adequate traffic flow, with some areas of delay. Existing p.m. peak-hour LOS for potentially affected urban street segments in the vicinity of the Unocal site are shown in Table 16-17. Existing traffic operations are within the range of acceptable LOS along the majority of SR-104 and SR-99, according to City of Edmonds and WSDOT guidelines. Between I-5 and SR-99, the LOS of SR-104 during the p.m. peak hour is E, which is below the acceptable level as defined by the WSDOT threshold.

Table 16-17. Unocal Site Vicinity—Existing Segment P.M. Peak-Hour Traffic Levels of Service

Roadway Segment	P.M. Peak LOS
SR-104 from Edmonds Terminal to Pine Street	B
SR-104 from Pine Street to 100th Avenue W	C
SR-104 from 100th Avenue W to SR-99	B
SR-104 from SR-99 to Interstate 5	E
SR-104 from Interstate 5 to 15th Avenue NE	C
SR-99 south of SR-104	C
SR-99 north of SR-104	C

Sources: WSDOT (2003) and local cities' traffic counts

Intersection Level of Service

Key intersections in the vicinity of the Unocal site were evaluated to determine existing traffic conditions based on the City of Edmonds and WSDOT guidelines. The existing p.m. peak-hour delays and LOSs, summarized in Table 16-18. All of the intersections analyzed currently operate at an acceptable LOS D or above with the exception of SR-104/15th Avenue NE, which operates at LOS E. This intersection is under WSDOT jurisdiction.

Table 16-18. Unocal Site Vicinity—Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (s/v) ^a	LOS
SR-104 at Dayton Street	15	B
SR-104 at Pine Street (Unsignalized)	17	C
SR-104 at 100th Avenue W	53	D
SR-99 at 244th Street SW	52	D
SR-104 at I-5 Southbound Off-ramp	29	C
SR-104 at 15th Avenue NE	59	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data from 1999-2001 (Bernard, personal communication, 2003) were reviewed for the affected segments of SR-104 in the vicinity of the Unocal site. Accident rates were determined the same way as for the Route 9 treatment plant site. Table 16-18 summarizes the findings.

As shown in Table 16-19, the accident rates along SR-104 segments range from 1.61 to 3.24 accidents per MVM. Most of the accidents occur at intersections. Approximately one-third of the accidents at locations other than intersections involve vehicles entering or exiting driveways; this is attributed to the high number of access points along the roadway (to businesses and to residences), in conjunction with limited sight distances along the route. The following locations are identified by WSDOT as high-accident intersections and major contributors to the total number of accidents throughout the SR-104 roadway:

- SR-104/100th Avenue West
- SR-104/Meridian Avenue North (76th Avenue West)

Table 16-19. Unocal Site Vicinity—Accident Analysis

Route Segment	Total Accidents		Non-Intersection Accidents	
	Number	Rate ^{a,b}	Number	Rate ^a
SR-104 from I-5 to SR-99	139	1.61	62	0.72
SR-104 from SR-99 to 100th Avenue W	120	3.24	44	1.19

^aMeasured as accidents per million vehicle miles (MVM)

^bStatewide rate is 2.97 accidents/MVM (principal arterials in urban areas)

Source: Bernard (personal communication, 2003)

Parking

On-street parking within the Unocal site vicinity is provided along Pine and Dayton Streets. The City of Edmonds has designated ferry holding lanes along SR-104, where only vehicles waiting for the ferry are allowed to park.

Truck Traffic

Truck traffic along SR-104 in the vicinity of the Unocal site is approximately 2 percent of the total p.m. peak-hour vehicle traffic. Truck traffic along Pine Street makes up 2 percent of p.m. peak hour traffic.

Transit

Transit service is not provided directly to the Unocal treatment plant site. However, Community Transit provides service along SR-104, 5th Avenue South, and Dayton Street, which is within 0.25 mile walking distance from the site.

Pedestrian and Bicycle Circulation

Sidewalks exist along at least one side of the street in most of the Unocal site vicinity. Pedestrian volumes are relatively low. Bicycle travel is also relatively low. According to its comprehensive plan (Edmonds, 2002), Edmonds plans to designate Pine Street/216th Street SW and Dayton Street as signed bicycleways, providing access between parks within the city and connections to other bicycle routes. The city also plans to designate SR-104 as a major bicycle route between 100th Avenue W and 5th Avenue S, providing access to the central business district and ferry terminal. Designated bicycle ways are signed along 3rd Avenue S, Pine Street, and Dayton Street, and bicycle parking facilities are available at city parks near the Unocal site.

Other Transportation Modes

Major airports near the Unocal site include Paine Field, approximately 8 miles north, which serves the Boeing Company's commercial airplane operations and some general aviation operations. The nearest international airport is Seattle-Tacoma International Airport, located in the City of SeaTac, approximately 30 miles south. The BNSF railroad operates a track west of the Unocal site. The track currently serves both BNSF freight traffic and Amtrak passenger service (six daily trains) and is planned for Sound Transit commuter rail service.

Various modes of commercial and recreational marine transportation operate in Puget Sound in the vicinity of the Unocal site. Edmonds Marina, home to more than 1,000 boats and to the largest charter fishing fleet on Puget Sound, is located immediately north of outfall Zone 6. WSDOT provides regularly scheduled ferry service from Edmonds Terminal to Kingston, Washington (approximately 25 round trips per day). Tribal fishing by the Suquamish, Tulalip, and Lummi Tribes also takes place in the waters offshore; the boundary between Management Areas 9 and 10 for tribal fishing extends west from the south corner of the Edmonds Marina breakwater. Marine transportation routes for tribal management areas are discussed and shown in Chapter 7.

Marine ports are a major industry using large areas of Puget Sound waterfront. Vessels using these ports include cargo vessels, commercial fishing vessels, tugs, barges, cruise ships, and naval vessels. The major ports nearest to the marine outfall zones are at Seattle (15 miles south) and Everett (15 miles north). More than 2 million cargo container units pass through Puget Sound each year.

The easternmost boundary of the maritime traffic lanes is approximately 10,000 feet offshore from Point Edwards (NOAA, 1997). Commercial maritime traffic, such as fishing vessels, may operate outside of the established traffic lanes. Recreational boating is described in Chapter 14.

The planned Edmonds Crossing project would be located at the same Unocal site proposed for the Brightwater Treatment Plant. This new multimodal facility would integrate existing Edmonds ferry, rail, and transit services and associated parking into a single complex. The complex would have the capacity for forecasted ferry ridership demands and commuter rail loading requirements, and a transit center that serves local bus and regional transit systems. This Final EIS addresses the construction traffic and operational traffic impacts of collocating Edmonds Crossing with Brightwater.

16.2.3.2 Conveyance: Unocal

The conveyance corridor for the Unocal site is a tunnel that would run underground between the existing North Creek Pump Station, located in Bothell near the I-405/SR-522 intersection, and the Unocal plant site. The pipeline would begin by following a cross-country route outside of existing ROWs between the North Creek Pump Station and the existing Kenmore Pump Station. From the Kenmore Pump Station, the route would run under SR-522 and SR-104 to the plant site.

The Unocal influent tunnel would add a new pump station near the existing Kenmore Pump Station at Portal 11 (near NE 175th Street and 68th Avenue NE).

Portals along the conveyance corridors are designated either primary or secondary. Primary portals are those required for tunnel construction. Secondary portals are not expected to be constructed, but might be needed for temporary ventilation, ground improvement, and/or supply of backfill grout. Requirements for secondary portals would be based on geotechnical information obtained and reviewed during detailed design. If required, secondary portals would be located along the conveyance corridors at intervals of approximately 10,000 feet from primary portals.

Final portal sites have not yet been selected.

Roadway System

The major access routes for construction of the Unocal corridor would include SR-522 and SR-104. Truck traffic would follow these routes to I-5 and I-405. Detailed descriptions of the characteristics of the roadways are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Traffic Volumes

The existing AWDT volume along SR-104 west of SR-99 ranges from 10,000 to 22,000 vehicles per day. Between SR-99 and I-5 the AWDT is approximately 47,000 vehicles per day, including nearly 4,700 in the p.m. peak period. Farther east, the AWDT along SR-104 decreases to around 21,000 vehicles per day. The SR-99 AWDT in the project vicinity is approximately 33,000 vehicles per day.

Roadway Level of Service

Existing p.m. peak-hour LOSs for urban street segments along the Unocal corridor are shown in Table 16-20. Three of the study segments currently operate at unacceptable levels, as defined by their respective jurisdictions (see Section 16.2.1.2). The segment of SR-104 from SR-99 to I-5 and the segment of NE 195th Street east of I-405 operate at LOS E. East of SR-104, SR-522 operates at LOS F. SR-104 and SR-522 are under WSDOT jurisdiction, and NE 195th Street, east of I-405, is under the City of Bothell jurisdiction.

**Table 16-20. Unocal Corridor—
Existing Segment P.M. Peak Hour Levels of Service**

Roadway	Level of Service
SR-104 from Edmonds Terminal to Pine Street	B
SR-104 from Pine Street to 100th Avenue W	C
SR-104 from 100th Avenue W to SR-99	B
SR-104 from SR-99 to Interstate 5	E
SR-104 from 15th Avenue NE to SR-522	C
SR-99 south of SR-104	C
SR-99 north of SR-104	C
SR-522 east of SR-104	F
SR-522 west of SR-527	C
NE 195th Street east of Interstate 405	E

Intersection Level of Service

Key intersections along the Unocal corridor access routes were evaluated to determine existing traffic conditions. The intersections analyzed are listed in Table 16-21. The existing delay and LOS for intersections in the project vicinity range from generally acceptable along SR-104 to unacceptable along SR-522. All intersections currently operate at LOS D or better during the p.m. peak period except for the intersections along SR-522, which operate at LOS E/F, and the SR-104/15th Avenue NE intersection, which operates at LOS E. The intersections operating at unacceptable levels are all under WSDOT jurisdiction.

**Table 16-21. Unocal Corridor—
Existing Intersection P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v)^a	LOS
SR-104 at Dayton Street	15	B
SR-104 at Pine Street (Unsignalized)	17	C
SR-104 at 100th Avenue W	53	D
SR-99 at 244th Street SW	52	D
SR-104 at I-5 Southbound Off-ramp	29	C
SR-104 at 15th Avenue NE	59	E
SR-104 at SR-522	190	F
SR-522 at SR-527	67	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data from 1999 through 2001 were reviewed for the state route segments of the Unocal corridor, primarily SR-522 and SR-104. Accident rates were determined for the affected segments in terms of accidents per MVM.

Table 16-22 summarizes the findings of the accident analysis. The majority of accidents occur at intersections, and approximately one-third of the accidents that occur away from intersections involve vehicles entering or exiting driveways. The following intersections were identified as major contributors to the total number of accidents in the Unocal corridor:

- SR-522/SR-104
- SR-522/61st Avenue NE
- SR-522/68th Avenue NE
- SR-522/73rd Avenue NE
- SR-522/80th Avenue NE
- SR-104/100th Avenue West
- SR-104/Meridian Avenue North

Table 16-22. Unocal Corridor—Accident Analysis

Route/Segment	Total Accidents		Non-Intersection Accidents	
	Number	Rate ^{a,b}	Number	Rate ^a
SR-522				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03
SR-104				
SR-522 to I-5	237	3.86	98	1.60
I-5 to SR-99	139	1.61	62	0.72
SR-99 to 100th Avenue W	120	3.24	44	1.19

^a Measured as accidents per million vehicle miles (MVM)

^b Statewide rate is 2.97 accidents/MVM (principal arterials in urban areas)

Source: Bernard (personal communication, 2003)

Parking

On-street parking is not allowed along SR-522 or SR-104.

Truck Traffic

WSDOT traffic data indicate that truck traffic along SR-522 within the potentially affected segments is approximately 1 percent of the total p.m. peak vehicle usage. Truck traffic along SR-104 is approximately 2 percent of total p.m. peak usage between Edmonds Terminal and I-5, and less than 2 percent between I-5 and SR-522.

Transit

Both Sound Transit and King County Metro provide service along SR-522 between the cities of Kirkland, Redmond, Bellevue, Woodinville, Bothell, Kenmore, Lake Forest Park, Shoreline, and Seattle. Metro provides day-long local and peak-hour express service, while Sound Transit provides regional express service focused toward peak-hour commuters. Metro provides service along SR-104 between Shoreline and Lake Forest Park and the east side of Lake Washington.

Pedestrian and Bicycle Circulation

Sidewalks along NE Bothell Way (SR-522) are intermittent; however, other areas have paved shoulders for pedestrians to walk. Sidewalks are present along Ballinger Way NE (SR-104) and provide a connection to the Burke-Gilman Trail across NE Bothell Way. The Burke-Gilman Trail becomes the Sammamish River Trail, a regional multi-use pedestrian and bicycle facility that parallels SR-522 east of SR-104. None of the potentially affected roadways have bicycle lanes or are designated bicycle routes.

Primary Portals

Final portal sites within the identified portal siting areas have not yet been selected. The primary portal siting areas for the Unocal corridor are shown in Figure 3-18 of Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 14

There are three candidate sites (A, B, and D) for this portal location (Figure 3-29). All three sites can be accessed directly via North Creek Parkway and NE 120th Avenue. The proposed construction route begins on I-405 and continues east on NE 195th Street, then goes south on North Creek Parkway and/or 120th Avenue NE. Outbound construction traffic would travel south on North Creek Parkway and/or 120th Avenue NE, east on NE 180th Street, and south on 132nd Avenue NE to SR-522. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- I-405 northbound ramp/NE 195th Street (signalized)
- I-405 southbound ramp/NE 195th Street (signalized)
- NE 195th Street/North Creek Parkway (signalized)
- 120th Avenue NE/North Creek Parkway (unsignalized)
- NE 180th Street/132nd Avenue NE (unsignalized)
- 132nd Avenue NE/SR-522 westbound ramp (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting between 4:15 and 5:00 p.m. and heavy vehicles making up 2 percent or less of the traffic stream. Directional traffic flow is heavier westbound on NE 195th and northbound on 132nd Avenue NE. For 120th Avenue NE and NE 180th Street in the afternoon, flows are evenly distributed in both directions.

Level of Service

The City of Bothell and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). Currently, five of the intersections operate within the acceptable roadway standards (Table 16-23). The I-405 ramp intersections with NE 195th Street, NE 195th Street/North Creek Parkway, 132nd Avenue NE/SR-522 westbound ramps, and 120th Avenue NE/North Creek

Parkway operate at LOS D or better. The City of Bothell's NE 180th Street/132nd Avenue NE intersection operates at LOS F.

**Table 16-23. Unocal Corridor, Portal 14—Existing Intersection
P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^a	LOS
I-405 Northbound Ramp at NE 195th Street	31	C
I-405 Southbound Ramp at NE 195th Street	23	C
NE 195th Street at North Creek Parkway	46	D
120th Avenue NE at North Creek Parkway	12	B
NE 180th Street at 132nd Avenue NE	70	F
132nd Avenue NE at SR-522 Westbound Ramp	25	C

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 11

Portal 11 is also a portal for the Route 9–195th Street and Route 9–228th Street alternatives and is described above under Primary Portals in the section titled Conveyance–195th Street corridor. See Table 16-7 for the intersection LOS ratings.

Portal 7

Portal 7 is also a secondary portal for the Route 9–195th Street alternative and is described above under Secondary Portals in the section titled Conveyance–195th Street Corridor. See Table 16-12 for the intersection LOS ratings.

Portal 3

There are three candidate sites (D, E, and F) for this portal location (Figure 3-22). Site D can be accessed directly via SR-104 or 232nd Street SW. Site E can be accessed directly via SR-104 and 92nd Avenue W. Site F can be directly accessed from 92nd Avenue W.

The proposed construction route to any of these three sites begins on I-5 and continues northwest on SR-104 to the intersection with 232nd Street SW. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-104/I-5 southbound off-ramp
- SR-104/232nd Street SW (stop-controlled)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2003 to evaluate the existing traffic conditions in the portal study area. The data at SR-104/232nd Street

SW had a peak hour beginning shortly before 5:00 p.m. The heaviest direction was northbound, with heavy vehicles making up 1 percent of the traffic. The lighter southbound traffic had heavy vehicles making up 2 percent.

Level of Service

The Edmonds and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Both intersections operate acceptably during the p.m. peak: SR-104/I-5 southbound off-ramp at LOS C with an average delay of 29 s/v; and SR-104/232nd Street SW at LOS D, 34 s/v. The latter intersection has a higher delay because it is controlled by a two-way stop. The delay value of 34 s/v represents the highest delay on the stop-controlled legs of the intersection (232nd Street SW).

Secondary Portals

Final portal sites within the identified secondary portal siting areas have not yet been selected. Secondary portals are not expected to be used. The secondary portal siting areas for the Unocal corridor are shown in Figure 3-18 of Chapter 3. Detailed descriptions of the characteristics of the roadways and intersections giving access to portal sites are given in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 13

There are three candidate sites (A, B, and C) for this secondary portal (Figure 3-28). Sites A and B can be accessed directly off of Woodinville Drive (SR-522). Site C access could occur from either SR-522 or NE 180th Street.

The proposed construction route to these portal sites begins on I-405 and continues west on SR-522 to the intersection with SR-527. With proposed construction traffic along the aforementioned streets, the following intersection is analyzed in this chapter:

- SR-522/SR-527 (signalized)

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed heavy vehicles making up 2 percent or less of the traffic stream. Directional traffic flow is heavier eastbound on SR-522.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). Currently, the SR-522/SR-527 intersection operates at unacceptable LOS E, 67 s/v, during the p.m. peak hour.

Portal 12

There are two candidate sites (C and E) for this secondary portal (Figure 3-27). Site C can be accessed directly from 80th Avenue NE. Site E can be accessed via a private driveway off of 80th Avenue NE.

The proposed construction route to either of these portal sites begins on I-405, continues west on SR-522 and then north on 80th Avenue NE. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- 80th Avenue NE/SR-522 (signalized)
- SR-522/SR-527 (signalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting between 4:30 and 5:00 p.m. Heavy vehicles comprised less than 2 percent of the traffic stream. Directional traffic flow is heavier southbound on NE 80th Street and eastbound on SR-522.

Level of Service

The WSDOT LOS standard threshold for intersections, which was assumed for these study intersections, is LOS D. The 80th Avenue NE/SR-522 intersection operates acceptably at LOS D with an average delay of 49 s/v. SR-522/SR-527, however, operates at LOS E, 67 s/v.

Portal 10

There are four candidate sites (A, C, D, and E) for this secondary portal (Figure 3-25), all directly accessible via SR-104 or NE 178th Street. The proposed construction route begins on I-405 and continues west on SR-522. To access site A or D, the route continues northwest on SR-104. To access site C or E from SR-522, the route goes along Brookside Boulevard NE and 44th Avenue NE to NE 178th Street. With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this chapter:

- SR-522/SR-527 (signalized)

- SR-522/68th Avenue NE (signalized)
- SR-522/80th Avenue NE (signalized)

Traffic Volumes

Afternoon peak-period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The data showed the peak hour starting between 4:30 and 5:00 p.m. Heavy vehicles comprise less than 1 percent of the traffic stream. Directional traffic flow is heavier eastbound on SR-522.

Level of Service

The Portal 10 intersection operations are shown in Table 16-24. The Lake Forest Park and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). Two of the study intersections currently operate below the LOS standard: SR-522/SR-527 and SR-522/68th Avenue NE.

**Table 16-24. Unocal Corridor, Portal 10—Existing Intersection
P.M. Peak-Hour Levels of Service**

Intersection	Average Delay (s/v) ^a	LOS
SR-522 at SR-527	67	E
SR-522 at 80th Avenue NE	49	D
SR-522 at 68th Avenue NE	103	F

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 5

Secondary Portal 5 is shared with the Route 9–195th Street alternative and is described above under Primary Portals in the section titled Conveyance–195th Street Corridor along with intersection LOS ratings.

16.2.3.3 Outfall—Unocal

Figure 3-21 in Chapter 3 shows the conceptual outfall alignments at Zone 6. Like Zone 7S, Zone 6 is between the major ports of Seattle and Everett and thus sees steady maritime traffic passing by in the sea lanes, 10,000 feet offshore.

Edmonds Marina, adjacent to Zone 6, was initially built in 1961 and was damaged by a storm in 1996. Restoration of the marina was completed in 1998. The marina provides the only public boating access in the highly populated 30-mile stretch between Seattle's Shilshole Bay and the Port of Everett. The marina extends 500 feet westward into Puget Sound and is dredged to a depth of 13 feet. The marina breakwater extends approximately 2,400 feet from the north to south along the shoreline. The marina

includes 729 wet-moorage slips and 300 dry-storage spaces. More than 50 guest moorage slips are available for overnight and short-term stays. Edmonds Marina is home to the largest charter fishing fleet on Puget Sound. During 2000, 99 percent of the available slips were occupied.

WSDOT provides regularly scheduled ferry service from Edmonds Terminal to Kingston, Washington (approximately 25 round trips per day). The ferry terminal is located near downtown Edmonds, north of the marina, and extends approximately 500 feet westward into Puget Sound. Although Edmonds Terminal is located north of Zone 6, the established ferry service route passes through Zone 6. However, it is not anticipated that construction vessel traffic would interrupt scheduled ferry service. Operation of the outfall would not impact ferry service.

An existing dock at Edwards Point, south of Edmonds Marina, is located in Zone 6. The dock extends nearly 900 feet from the shoreline to a water depth of approximately 60 feet. The dock was used by the Unocal facility, but is no longer in service for maritime traffic.

The land-side access to the Zone 6 outfall would be similar to the access to the Unocal Treatment Plant site. Thus, the affected environment would coincide with that of the Unocal site.

16.3 Impacts and Mitigation

16.3.1 Impacts and Mitigation Common to All Systems

This section describes the anticipated impacts on the affected transportation system during both construction and operation phases. Impacts are discussed separately for construction and operation of the treatment plant, conveyance system, and outfall. Proposed mitigation measures are also described.

16.3.1.1 Analysis Methodology

Cumulative traffic volumes for each alternative were found by overlaying all of the site treatment plant trips, conveyance system trips, and outfall trips onto the background traffic volumes prior to performing the impact analyses.

In addition, a “no action” analysis was performed for each of the future year scenarios. The no-action analysis represents a future “baseline” condition, reflecting overall predicted traffic growth in the area without the project. It assumes certain roadway improvements that would occur regardless of Brightwater. The section below entitled Impacts: No Action Alternative provides a better understanding of the differences in traffic that are attributable to the project, compared with those that are simply the result of area wide traffic growth.

Construction impacts are assessed for the initial phase of construction (36 mgd production level), whereas operational impacts are provided for all capacities: 36 mgd, 54 mgd, and (for Unocal only) 72 mgd. Impact analyses for any construction needed for future capacity expansions beyond the initial 36 mgd would be conducted at the time required for implementation.

16.3.1.2 Planned Improvements

A number of projects are currently planned for the potentially affected roadways. These projects, which range from pavement rehabilitation and overlay to roadway expansion for additional capacity, were included in the modeling of the future alternatives to account accurately for future conditions. Projects located along the potentially affected routes are listed below. Although these projects have been identified as needs, many have not yet received full funding and are not currently programmed for construction; as a result, the year of construction is not always known.

In addition to roadway projects, planned developments are also projected to occur within the project area. Potential construction and operational impacts were reviewed for the developments discussed below. As with the roadway projects, full funding and scheduling of the developments are not known.

Edmonds Crossing. The proposed Edmonds Crossing project is located in the City of Edmonds and is intended to provide a long-term solution to current operations and safety conflicts between ferry, rail, automobile, bus, and pedestrian traffic in downtown Edmonds. To do so, the project proposes to relocate the existing state ferry terminal from Main Street to another site farther south from the downtown core. A multimodal center would be established that would integrate the ferry, rail, and transit services into a single complex. The new complex would provide an upgraded ferry terminal designed to meet the operational requirements for accommodating forecast ferry ridership demand. Access would be provided from SR-104 from its current intersection with Pine Street.

This project currently has \$10 million in state funding and \$8 million in federal funding for design and land acquisition. The \$18 million in current funding represents approximately 10 percent of the total cost to develop and construct the project. The remaining funds have not yet been obtained. Thus, whether and when the proposed Edmonds Crossing is actually built will remain somewhat speculative until funding is secured at some point in the future.

Edmonds Crossing has been included as a sub-alternative to the Unocal site. Two scenarios were examined: Construction-related activities restricted to the structural lid, and construction of the lid with the Edmonds Crossing terminal facilities. To capture the “worst case” scenario, construction of the Brightwater and Edmonds Crossing projects was assumed to be concurrent. Operations activities for the Edmonds Crossing were included in the 2040 54-mgd analyses.

Costco Warehouse. The Woodinville warehouse of Costco Wholesale Corporation is planned to be constructed in the southwest quadrant of the intersection of SR-9 and SR-522 (eastbound ramps). Specific project information is not available for this project; however, for the purpose of the construction impact analyses, a 250,000-square-foot warehouse facility built with tilt-up construction methods was assumed. These assumptions are similar to other Costco facilities. Trip generation estimates during operations were provided by Costco (TSI, 2002). Construction and opening dates are currently not defined for this development.

Analyses in the vicinity of the Route 9 site were conducted both with and without the Costco project. For a conservative approach, peak construction activities of the Brightwater project and Costco development were assumed to occur concurrently in 2007. Costco operations in 2007, which is a worse case than Costco construction, was also considered in the analyses.

SR-9. Capacity improvements by WSDOT are planned for SR-9 (from SR-522 to SR-524) to be completed by November 2006 and farther north (to 176th Street SE) to start construction by 2010. Improvements include a new signal at the intersection of SR-9

and SR-522 westbound ramps, a new through lane in each direction, and a center two-way left-turn lane between SR-522 and 228th Street SE, as well as one additional through lane in each direction between 228th Street SE and SR-524 (Maltby Road). Sidewalks at selected locations are planned, and 8-foot-wide shoulders, which can be used by bicyclists, will be constructed. Analyses both with and without the project were conducted. Impacts of the SR-9 improvements occurring at the same time as Brightwater plant construction were also analyzed.

Snohomish-Woodinville Road Widening. Snohomish County is planning improvements to the Snohomish-Woodinville Road in 2005 (Snohomish County Project #RC1079). The project will widen the roadway to three lanes from the King County line and match WSDOT's proposed five-lane section at the SR-522 interchange. The three-lane section will consist of one travel lane in each direction and a center turn lane. Other improvements include a shoulder on the east side of the roadway; a planter strip, curb, and sidewalk on the west side; and water detention ponds (Snohomish County, 2003b). As of August 28, 2003, the project as described here is fully funded and is expected to be completed by November 2005 (Lee, personal communication, 2003). The impacts of this project were not included in the traffic analysis because no intersections or roadway segments on this road were included in the analysis of affected roadways.

SR-99. The City of Shoreline is planning improvements to the safety and mobility of pedestrians, transit users, people with disabilities, and drivers along Aurora Avenue N (SR-99) from N 165th Street to N 205th Street. Additionally, the project would improve the economic development potential, enhance the livability of adjacent communities, and support the City's Comprehensive Plan. The project would add business access and transit (BAT) lanes, curbs, gutters, landscaping/street furnishings, and sidewalks on both sides; the center median safety lane would be landscaped, with left turn and U-turn provisions; and a traffic signal would be installed at N 182nd and N 195th Streets. All traffic signals would be interconnected and include pedestrian crossings. Transit stops with new shelters, new street lighting, and underground utilities would be installed. Improvements to the existing storm water drainage, including water quality, would also be implemented. The expected start date and availability of funding are unknown at this time (Shoreline, 2003a, 2003b). Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-104. Asphalt pavement overlay is planned for the segment between 15th Avenue NE and 35th Avenue NE by the end of 2005. Intersection capacity improvements are planned for the intersection of SR-104 (Edmonds Way) and 100th Avenue West. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-522. A number of projects are planned for construction along SR-522 over the next 10 years. Pavement and drainage modifications are planned for the vicinity of 80th Avenue NE and Swamp Creek. High-occupancy vehicle (HOV) lane priority treatments, including development of queue bypass lanes (requiring roadway expansion), are planned for construction by the end of 2003 at several intersections along SR-522 from I-5 to I-405. In addition, HOV lanes (roadway widening) are planned for construction by the

end of 2007 for the segment between SR-527 and I-405. East of Woodinville, SR-522 will be widened by a lane in each direction to SR-2 in Monroe by 2011. Interchanges will also be constructed by 2007 to remove at-grade intersections between I-405 and SR-2. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-522 Multimodal Corridor at Kenmore, Phase I. The City of Kenmore has secured funding to complete several improvements to the SR-522 (NE Bothell Way) corridor. The goal is to ease congestion through Kenmore, increase pedestrian and vehicular safety, improve the appearance of the corridor, and improve the function of the major intersections within the city. The city has received state and federal grant funds, as well as contributions from WSDOT, King County, Northshore Utility District, and private developers. Construction is scheduled for 2005 and 2006. The proposed improvements include intersection realignments, construction of an underpass for the Burke-Gilman Trail, installation of landscaped medians and sidewalks, and roadway improvements. A preliminary design report was completed in May 2003, and the City Council has selected a preferred alignment, which expands the roadway to the south into the right-of-way for the Burke-Gilman Trail (Kenmore, 2003). Analyses both with and without the improvements at the intersections of SR-522 and 68th Avenue NE and 68th Avenue NE and NE 181st Street were conducted.

SR-522 Multimodal Corridor at Kenmore, Phase II. Phase II of Kenmore's SR-522 project is planned to improve safety, circulation, and operation of automobile, transit, and non-motorized users of the roadway corridor. Phase II will extend the SR-522 business and transit (BAT) lane system from 73rd Avenue NE to the eastern city limits. Also included are: improvements to 80th Avenue NE north of SR-522; installation of traffic signals, medians, sidewalks, and access management improvements; and replacement of the Swamp Creek bridge. The project is in the City's six-year Transportation Improvement Plan (TIP) and has received state, federal, and Sound Transit funds. Construction is expected to take place sometime between 2007 and 2009 (Kenmore, 2003). Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-522 Multimodal Corridor at Bothell, Phase I. This City of Bothell project is still in the early stages. It does not have a preferred alternative, and no funding has been secured. Three primary alternatives are being reviewed at this time. A preliminary preferred alternative is expected to be selected in October or November of 2003. An expected completion date is unknown at this time (Bothell, 2003). Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

Beardslee Boulevard/Ross Road. The connection to Ross Road from the curve where NE 195th Street becomes Beardslee Boulevard is too close to the signalized freeway ramps. In addition, future I-405 improvements will eliminate this intersection. Therefore, the City of Bothell is undertaking to design and build a new connector road. The new intersection on Beardslee Boulevard will be signalized and the existing intersection will be closed to all movements except possibly right-hand turns from NE 195th St. The

expected start date and availability of funding are unknown at this time (Bothell, 2003). Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

NE 180th Street/132nd Avenue NE. The City of Bothell has plans to signalize this intersection and give it increased capacity in the near future. The project is fully funded and construction is estimated to be complete by 2005. In conjunction with the project, the SR-522/132nd Avenue NE interchange adjacent to 180th/132nd would be rechannelized to make use of the existing roadway width (Bothell, 2003; Safavian, personal communication, 2003). Analyses both with and without this project were conducted.

NE 195th Street. Asphalt pavement overlay is planned by 2004 for the segment of NE 195th between 120th Avenue NE and North Creek Parkway.

Bicycle and Pedestrian Facilities. Several projects are planned:

- **Snohomish-Woodinville Road.** Snohomish County Project #RC1079 includes construction of a shoulder and sidewalk along the east side of the roadway between SR-522 and the King County line.
- **SR-9–SR-522 to 176th Street SE Widening.** This project will provide sidewalks in selected locations. Initial improvements funded by the State’s “Nickel Funding Package” will be implemented from SR-522 to 176th Street SE. Additional improvements are currently slated for inclusion in the Regional Transportation Improvement District (RTID) package of projects for Snohomish County.
- **Snohomish County Bikeways.** The Snohomish County Comprehensive Plan (2000 update) and Mill Creek East UGA Plan (adopted May 2002) indicate plans for bikeways along SR-524, SR-9, 228th Street SE (west of SR-9), 180th Street SE (west of SR-9), and Broadway Avenue (north of SR-524).

In addition, other planned and programmed projects within the vicinity of the Brightwater plant and portal construction sites were also reviewed and considered. These projects do not appear to impact or be impacted by Brightwater. King County will continue to monitor these projects in conjunction with Brightwater construction and address impacts, as necessary, during the permitting process. The projects include:

- City of Shoreline Gateway Plans
- Interurban Trail, from N 145th Street to N 205th Street and crossing at Aurora Avenue N and N 155th Street
- Aurora Avenue Improvements, from N 145th Street to N 165th Street
- 15th Avenue NE Improvements, from N 146th Street to NE 196th Street
- Signalization of 15th Avenue NE and NE 165th Street
- Shoreline, North City Business District Improvements

- Shoreline, 175th Street Sidewalks
- SR-522/South Access Interchange, direct access to the UW-Bothell/Cascadia Community College campus
- Expansion of the UW-Bothell/Cascadia Community College campus, contingent upon the direct access being completed.

16.3.1.3 Impacts and Mitigation Common to All Systems

Construction Impacts Common to All Systems: Treatment Plant

The impacts discussed in this section do not include the cumulative impact of concurrent SR-9 construction. Such concurrent construction is discussed under the Route 9 analyses in Section 16.3.2.1. The potential impacts that could result from construction activity at either treatment plant site are related mainly to increased traffic volumes associated with earthwork and material delivery. Although many truck trips would be generated by construction, their effect on traffic operations and LOS is dependent on overall background traffic in the system. Under the worst-case scenario, additional trips associated with the most intense site construction activity represent only a few percentage points difference in total daily traffic along the construction traffic routes. Impacts to roadway segment afternoon peak-hour LOS along access routes would be minimal. Intersections along access routes may experience slight increases in intersection delays. Impacts to bicycle, pedestrian, transit, freight, and (for Unocal) ferry travel would be minor.

A higher number of accidents could potentially occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Operational impacts represent either a minor decrease in traffic as compared to the No Action Alternative (Route 9 site) or a minor increase (Unocal site). For detailed traffic impact analyses, see the sections for these respective sites. The project will have minimal or no impacts to freight, transit, bicycle, pedestrian, and (for Unocal) ferry traffic during operation.

Proposed Mitigation Common to All Systems: Treatment Plant

Construction Mitigation: Treatment Plant

The following mitigation measures have been identified to reduce the adverse impacts on the transportation system at both treatment plant sites during construction. Specific

mitigation plans will be established with permitting agencies during the permit application process.

- The transportation impacts associated with construction and operation of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.
- Develop and implement a Traffic Management Plan (TMP) for movement of employees, equipment, and materials to reduce impacts along project traffic travel corridors. Coordinate with local agencies for final plan approval, including construction hours, provision of adequate non-motorized access, a pavement monitoring program, truck access routes (i.e., Snohomish County haul agreement, in accordance with Section 13.40.080 SCC), and acquisition of necessary permits for the construction of the plant and conveyance system.
- Notify the police, fire, ambulance, and transit agencies of lane encroachments and provide flagger or other traffic controller to maintain safe public access and emergency vehicle access routes. Off-duty police hired by the project sponsor may be required to direct traffic near the site during construction.
- Provide necessary traffic control at all affected locations, including temporary signing, striping, and traffic signals, as required. All temporary traffic control plans are subject to permitting jurisdiction review and approval.
- Maintain traffic flow and access to properties affected by the construction activities.
- Provide onsite parking management plan for all construction workers and visitors. Carpools would be encouraged and would receive first-priority on parking spaces or other incentives.
- Monitor progress of other potential roadway construction projects along routes used for construction traffic access to Brightwater. Evaluate need to modify routes or times of operation to avoid conflicts with such other projects. See discussion of Planned Improvements above.
- Monitor the condition of the streets directly affected by Brightwater construction over the course of the project, and provide traffic mitigation as determined in conjunction with local jurisdictions. Restore streets affected by construction to pre-construction conditions.
- Provide safe access for bicyclists and pedestrians during construction. This may require construction of temporary or permanent facilities for non-motorized traffic.
- Provide multiple sources of construction activity updates such as informational signage, newspaper notices, and/or a project website.
- Coordinate all utility construction activities to minimize disruptions to traffic.
- Coordinate with and monitor progress of other potential improvement/construction projects with the appropriate jurisdictions. Provide an overall

construction schedule including planned local and regional construction improvement projects to minimize conflicts with the project construction activities.

Operation Mitigation: Treatment Plant

Trucks accessing either plant site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals and for biosolids transport will be designated during the permitting phase. These routes would be determined upon final selection of the site.

Because operating the Brightwater Treatment Plant would generate minimal traffic, and effectively reduce traffic impacts for the Route 9 alternative on the surrounding roadway network in comparison to the no build alternative, mitigation requirements beyond the existing applicable development regulations for the operation of the treatment plant would be minimal. King County would work with local agencies to identify necessary site-specific traffic mitigation measures.

16.3.1.4 Conveyance Impacts and Mitigation Common to All Systems

Construction Impacts Common to All Systems: Conveyance

Construction of the conveyance system would require access to portal locations along the selected corridor. Access routes to portal locations would generally follow existing interstates, state routes, and major arterials. These specific routes are identified and described in the following portal discussions. Impacts were evaluated for conveyance corridors during the peak construction period (2007). Impacts during the operations and maintenance phase would be minimal and are discussed qualitatively. Trip credits associated with the removal of existing or potential land uses at the portal sites were not assumed. Impacted areas are on average 2-acre sites for which displaced trips were assumed to be minimal.

In addition to generating construction truck traffic, all conveyance alternatives would involve some disturbance to existing traffic patterns during the construction period. In densely developed areas, construction could restrict access to homes or businesses in the portal or pump station vicinity. For some portals on all system alternatives, existing roadways would require pedestrians and other non-motorized entities (e.g., bicyclists) to share the road with construction vehicles. King County would commit to mitigation measures to avoid or minimize these impacts. The portals would be located on properties adjacent to roadways. No changes to, or realignments of, public roadways are anticipated.

Access to most portal sites would require use of local and residential streets. These types of streets may be narrow, may not include formal walking areas for pedestrians, and may

have intersections that require wide turns by larger vehicles. Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance, provides an inventory of the street systems that would be used for access to portals.

Proposed Mitigation Common to All Systems: Conveyance

Mitigation measures would be provided to support access to selected portal locations. Proposed mitigation during construction of the conveyance system would be similar for all three conveyance systems. Measures include:

- The transportation impacts associated with construction and operation of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.
- Develop and implement a TMP, as described above under Construction Mitigation: Treatment Plant, for movement of employees, equipment, and materials and reduction of conflicts with existing peak traffic.
- Notify local agencies of all lane encroachments during construction. Off-duty police hired by King County may be required to direct traffic near construction sites.
- Provide parking for construction equipment and vehicles onsite to avoid impacts to adjacent streets.
- Provide separation of motorized and non-motorized traffic or equivalent measures where necessary to provide safety and prevent conflicts per TMP.

16.3.1.5 Outfall Impacts and Mitigation Common to All Systems

Impacts and mitigation measures during construction would be similar for both outfall zones.

Construction Impacts Common to All Systems: Outfall

During construction of the marine outfall, both land-based and marine traffic in the vicinity of Point Wells and Edwards Point would be temporarily impacted. The proposed outfall alignments would not extend into the marine traffic lanes. However, construction methods at both Zones 6 and 7S may require anchor lines, pipelines floated into position, tugs, and barges that may temporarily enter or cross maritime traffic lanes. During construction, commercial and recreational maritime traffic would have to navigate around in-water construction vessels as well as their anchor systems. Potential impacts to the land traffic system would be related mainly to increased traffic volumes associated with

on-land removal of excavated materials (in-water work would be done by barge) and pipeline material delivery.

Excavated soils removed during onshore construction would likely be transported by dump trucks to a regulated landfill site selected on the basis of presence and concentration of contaminants (if any) in the soils. Excavated soils could be stored at the outfall construction staging area (at Portal 19 for construction in Zone 7S and at the Unocal Plant site for construction in Zone 6) and transported during non-peak traffic hours. The impact analyses for the outfalls were included with Portal 19 and the Unocal site for Zones 7S and 6, respectively.

Soils excavated by barge-mounted equipment during nearshore construction would likely be transported by barge and disposed of at aquatic disposal sites regulated by the U.S. Army Corps of Engineers. The “working barge,” equipped with a crane for excavation and laying pipeline segments, would be anchored to the seafloor with “spuds.” Spuds act like pins sticking into the seafloor below the barge and can be used in water as deep as 60 feet. Spuds can be raised and lowered to allow movement of the working barge. Since the spuds move up and down vertically from the barge, no additional footprint space (barges are typically 75 by 200 feet) would be required. For barges supplying the working barge, or for barges beyond water depths of 60 feet, anchor lines would be used. Anchor lines extend from the barge in several directions and are typically 1,000 feet long, but could be up to 2,000 feet long.

Offshore construction would not require excavation. However, during construction, commercial and recreational maritime traffic would have to navigate around in-water construction vessels as well as their anchor systems.

Construction Mitigation: Outfall

To the extent possible, delivery or removal of materials from the construction sites at Zones 6 and 7S would be minimized during peak traffic periods and would utilize designated maritime traffic lanes and truck traffic routes. Construction activities would be coordinated with WSDOT, marina, tribal, commercial, and other appropriate officials to reduce interference with marine and land transportation systems. Offshore construction vessels would be marked and lighted in accordance with applicable U.S. Coast Guard regulations so that operators of other vessels would be alerted to their presence and operating status.

16.3.2 Impacts and Mitigation: Route 9 System

16.3.2.1 Treatment Plant

Two types of potential impacts were evaluated for the Route 9 treatment plant site. Potential impacts may occur along access routes as a result of traffic generated during construction and as a result of ongoing operation and maintenance of the plant. Construction impacts were assumed to occur during the year of overall peak construction impacts, 2007. The construction schedule is documented in Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall.

The businesses currently occupying the Route 9 site would be displaced by the proposed Brightwater Route 9 site development, resulting in trip credits to the transportation network. (Brightwater would generate fewer trips during operation than current uses on the Route 9 site.) Driveway counts were performed in February 2003 by CH2M HILL to estimate the existing traffic volumes. The peak-hour volume at each business represents the highest 1-hour volume within the p.m. peak traffic period of the adjacent street. The existing driveway traffic is shown in Table 16-25.

Table 16-25. Route 9 Site—Summary of Existing Driveway Traffic

Existing Business Name(s)	P.M. Peak Hour (4:00-5:00 p.m.)		
	Trips In	Trips Out	Total Trips
StockPot, Inc., Quality Business Systems, and Bear Creek Grange Hall ^a (<i>shared driveways at westbound approach of SR-9 and 228th Street SE</i>)	18	62	80
Active Excavators	1	17	18
Wild West Mustang Ranch	1	3	4
CT Sales	1	6	7
Woody's Auto Yard	6	8	14
Insurance Auto Auctions	12	15	27
Fitz Auto Parts	30	32	62
Total	69	143	212

^a Vehicular generation at the Grange Hall was observed to be minimal during the peak hour
Source: Counts performed by CH2M HILL on February 11 and 18, 2003

The existing businesses' daily trip generation numbers were also estimated using the ITE's *Trip Generation Manual* (ITE, 1997). Based on data on the existing businesses currently operating at the Route 9 site, including the Grange, an approximation was made of the peak-hour and daily trips currently generated onsite by those businesses. The approximations were 230 to 270 afternoon peak-hour and 700 to 900 daily trips. Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, provides greater detail on the displacement of existing land use and vehicle trips.

Construction Impacts: Route 9 Treatment Plant

Unless specifically noted, the analyses took a conservative approach by assuming that no SR-9 improvements were constructed. Additional trips associated with the most intense construction activity at the Route 9 site represent an approximate 1.5 percent increase in total daily traffic along SR-9 just north of SR-522. The net total trip generation of the Route 9 site during construction is estimated to be slightly higher than the existing trips from the displaced businesses.

Snohomish County has its own specific methods and guidelines for analyzing traffic impacts, which were not used in the construction impacts analyses. King County has agreed to analyze Route 9 site construction impacts using Snohomish County's methodology at the time of permitting. In general, Snohomish County's methodology is based upon the HCM method. However, the Snohomish County methodology for segment LOS, particularly for the segment of 228th Street SE from 45th Avenue SE to SR-9, results in significantly worse conditions. The segment analyses results for the 228th Street SE segment would likely be one or two service levels worse when using the Snohomish County methods. Although there are differences between the segment results, using Snohomish County procedures versus the HCM procedures, the 228th Street SE/SR-9 intersection are very similar.

Construction Traffic Impact Analysis (2007)

The construction of a treatment plant at the Route 9 site would increase traffic along the site access route by an estimated 852 daily one-way vehicle trips for the peak duration of construction, including 114 earthwork, 64 concrete, and 32 material trucks. Each trip represents one leg of a round trip. Approximately 642 of the daily trips would be made by workers traveling to and from the site. In order that the traffic assessment would represent worst-case traffic operating conditions, the peak construction traffic was assumed to happen during the peak hours of the surrounding roadway. Using that assumption, during peak construction, up to 319 site construction-related vehicle trips would occur during the p.m. peak hour.

The overall trip generation to the project site is made up of the new trips generated by the construction of the treatment plant with a reduction for existing trips that are associated with the displaced land uses (Table 16-25). The net total trip generation of the Route 9 site during construction is estimated at 107 additional vehicles during the peak hour.

Figures 16-2 and 16-3 show the construction traffic conditions for the Route 9 site vicinity. The figures illustrate the vehicular volumes and means of access for trucks and workers during peak construction periods for the Route 9 treatment plant site. These projections also account for the removal of trips from the roadway system as a result of the displacement of existing businesses.

All roadway segments remain the same as in the 2007 No Action conditions, while the delays at most of the intersections would be a few seconds greater (4 seconds or less) compared with pre-construction conditions. The intersection of SR-9 at 228th Street SE

would, however, experience a significantly longer average vehicle delay during construction of either of the Route 9 conveyance corridors. The LOS would change from D to F with the Brightwater traffic. The Snohomish County method, would likely also result in LOS F conditions for this case. This is a significant impact and is proposed to be mitigated by the mitigation measures proposed below. Increased delays due to construction activities would also cause the SR-9 at SR-522 eastbound ramps intersection to change from LOS D to E conditions (Table 16-26).

Table 16-26. Route 9 Site and Corridors—Estimated Intersection P.M. Peak-Hour Traffic During Construction and Operation

Intersection	2007 No Action		2007 Construction ^c		2010 No Action		2010 Operation (36 mgd)	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
Route 9–195th Street Corridor								
SR-99 at 244th Street SW	E	58	E	62	E	63	E	63
SR-104 at I-5 SB Off-ramp	C	32	C	33	D	36	D	36
SR-104 at 15th Avenue NE	E	66	E	69	E	73	E	73
SR-104 at SR-522	F	212	F	212	F	229	F	229
SR-522 at SR-527	F	88	F	92	F	105	F	105
SR-9 at 228th Street SE ^b	D	43	F	90	D	44	D	42
SR-9 at SR-522 EB Ramps ^b	D	48	E	58	D	53	D	48
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	C	21	C	24	C	22	C	22
SR-9 at SR-524	E	80	E	73	F	88	E	78
Route 9–228th Street Corridor								
SR-522 at SR-527	F	88	F	92	F	105	F	105
SR-9 at 228th Street SE ^b	D	43	F	117	D	44	D	42
SR-527 at 228th Street SE	E	58	E	64	E	65	E	65
SR-9 at SR-522 EB Ramps ^b	D	48	E	62	D	53	D	48
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	C	21	D	26	C	22	C	22
SR-9 at SR-524 ^b	E	80	E	74	F	88	E	78

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Does not assume WSDOT SR-9 widening project improvements are in place

^c Does not assume concurrent construction of SR-9 road improvements and treatment plant

Effect of Concurrent Construction (SR-9 Improvement Project)

Construction impact analyses assuming concurrent SR-9 improvements were performed for intersections along SR-9. Minimal diversions were assumed due to the limited parallel route opportunities within the project vicinity. The increased delays, in conjunction with the limited alternate routes may also cause an extended peak traffic period.

The analysis of the concurrent condition assumed that both the Route 9 treatment plant and SR-9 roadway improvement projects would be in the midst of peak construction activities during the year 2007. WSDOT's current plans assume the portion of the SR-9 improvement project between SR-522 and SR-524 to be completed by 2006, with its peak

construction period likely occurring between 2005 and 2006. Schedule delays could occur, however, pushing the peak into the future. By assuming the peak is delayed until 2007, that year then represents the worst-case concurrent traffic condition for both projects.

Table 16-27 compares the 2007 traffic estimates for (a) the SR-9 improvements alone, versus (b) the SR-9 and Brightwater projects together, peaking concurrently. (For comparison, Table 16-26 has estimates for Brightwater under the No Action for the SR-9 widening project). The SR-9/228th Street SE intersection is projected to have a longer average delay and an LOS change from D to F. The SR-9/SR-522 Eastbound ramps intersection is projected to operate at LOS E. The SR-9 roadway segment north of SR-522 is projected to remain at LOS F. All of the SR-9 intersections are under state jurisdiction.

Table 16-27. SR-9 Study Intersections P.M. Peak-Hour Levels of Service and Delay—Concurrent Brightwater and SR-9 Roadway Improvements Construction

Intersection	2007 No Action, SR-9 Roadway Improvements Construction Only ^b		2007 Construction, Both SR-9 Roadway Improvements and Brightwater Facilities	
	LOS	Delay ^a	LOS	Delay ^a
Route 9–195th Street Corridor				
SR-9 at 228th Street SE	D	54	F	114
SR-9 at SR-522 Eastbound Ramps	D	48	E	58
SR-9 at SR-522 Westbound Ramps (Unsignalized)	C	21	C	24
SR-9 at SR-524	F	117	F	108
Route 9–228th Street Corridor				
SR-9 at 228th Street SE	D	54	F	145
SR-9 at SR-522 Eastbound Ramps	D	48	E	62
SR-9 at SR-522 Westbound Ramps (Unsignalized)	C	21	D	26
SR-9 at SR-524	F	117	F	109

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b LOS calculated based on intersection capacity during the construction of the SR-9 Roadway Improvements project.

Effect of Concurrent Construction (Costco Warehouse Development)

Construction impact analyses assuming concurrent Costco Warehouse construction were performed for the intersections along SR-9.

The analysis of the concurrent condition assumed that both the Route 9 treatment plant and Costco Warehouse project would be under construction during the year 2007. The year 2007 represents the peak construction of the Brightwater project. Currently the construction schedule for the Costco project is unknown, but analyzing 2007 as the construction year ensures that worst-case traffic condition of both projects' construction impacts has been analyzed.

Table 16-28 depicts an estimate of traffic operations during concurrent construction of the treatment plant and the Costco Warehouse. The combined traffic impacts with both the treatment plant and Costco construction traffic would be nearly the same as the impacts with only the treatment plant. The SR-9/SR-522 Westbound ramps intersection is projected to have a slight increase in delay, which would cause an LOS change from C to D for the 195th Street alternative.

Table 16-28. Route 9 Site—Estimated Intersection P.M. Peak-Hour Traffic with the Costco Warehouse Development

Intersection	2007 Treatment Plant Construction		2007 Treatment Plant and Costco Construction	
	LOS	Delay ^a	LOS	Delay ^a
Route 9–195th Street Corridor				
SR-9 at 228th Street SE ^b	F	90	F	90
SR-9 at SR-522 Eastbound Ramps ^b	E	58	E	58
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	C	24	D	26
SR-9 at SR-524 ^b (Maltby Road)	E	73	E	74
Route 9–228th Street Corridor				
SR-9 at 228th Street SE ^b	F	117	F	117
SR-9 at SR-522 Eastbound Ramps ^b	E	62	E	62
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	D	26	D	28
SR-9 at SR-524 ^b (Maltby Road)	E	74	E	75

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Does not include WSDOT SR-9 widening project

Effect of Cumulative Projects (SR-9 Improvements and Costco Warehouse Operations)

A cumulative analysis, representing the highest impact of all planned projects within the project vicinity, was performed. The cumulative analysis assumed concurrent peak construction activities of the SR-9 roadway improvements and Route 9 treatment plant, as well as Costco Warehouse operational traffic. Costco operational traffic is greater than Costco construction traffic.

Table 16-29 depicts an estimate of the cumulative traffic operations. Delays are expected to increase at all of the study intersections. LOS analyses show that all of the SR-9 study intersections would operate at LOS E/F levels.

Table 16-29. Route 9 Site—Estimated Intersection P.M. Peak-Hour Traffic with Cumulative Project Impacts

Intersection	2007 with Treatment Plant Construction, SR-9 Construction, and Costco Warehouse Operations	
	LOS	Delay ^a (s/v)
Route 9–195th Street Corridor		
SR-9 at 228th Street SE ^b	F	123
SR-9 at SR-522 Eastbound Ramps ^b	E	59
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	E	40
SR-9 at SR-524 ^b (Maltby Road)	F	113
Route 9–228th Street Corridor		
SR-9 at 228th Street SE ^b	F	157
SR-9 at SR-522 Eastbound Ramps ^b	E	61
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	E	46
SR-9 at SR-524 ^b (Maltby Road)	F	114

^a Average delay, measured in seconds per vehicle, (s/v) includes deceleration time, stopped time, and acceleration time due to intersection control delay as described in Table 16-1.

^b LOS calculation based on intersection capacity during construction of the SR-9 Roadway Improvements project

Operation Impacts: Route 9 Treatment Plant

During treatment plant operation and maintenance, two different stages of project build-out were evaluated for the Route 9 treatment plant site: 36 million gallons per day (mgd) capacity and 54 mgd capacity. The treatment plant would be designed to treat 36 mgd by 2010, with features to allow for expansion to 54 mgd in 2040.

Each trip represents one direction (inbound or outbound) of a round trip. The 36-mgd plant would generate 235 total trips per day, including 120 employee trips, 6 biosolids/grit truck trips, 4 chemical truck trips, approximately 10 visitor trips, and 95 community-oriented building trips. For worst-case analysis, afternoon peak-hour trips

would total 62, with 2 of those being truck trips. By 2040, at 54-mgd, daily trip generation would total 301 trips, with 78 occurring in the p.m. peak hour. The overall trip generation of the project site during 2010 operations, taking into account reduction of the existing trips that are associated with the displaced land uses, is a net decrease of approximately 150 vehicles during the peak hour. During 2040 operations, a net decrease of 134 vehicles is estimated for the adjacent roadway network during the peak hour.

The number of employees at the treatment plant would range from 53 (at 36 mgd) to 75 (at 54 mgd), plus an additional 3 to 7 full-time employees (FTEs) for the community-oriented building. Two work shifts are projected with the maximum number of employees during the day shift at 39 to 49 people, including process, administration, maintenance, and coordinator. The day shift would also include the 3 to 7 FTEs for the community-oriented building.

The Route 9 site would provide parking internally to accommodate the following parking needs:

- Administration building – 50 stalls
- Maintenance building – 20 stalls
- Community-oriented building – 100 stalls
- Solids handling – 10 stalls

Accident rates and types of accidents should not be affected by the project related operational traffic because of the net decrease in vehicles on the local roadway network.

2010 Operations

The number of trips generated by the project represents a minor decrease in traffic as compared to the No Action Alternative. As a result, no potential operational impacts have been identified for the Route 9 site. Estimated traffic conditions in 2010 with operation of the Route 9 treatment plant are illustrated in Figure 16-4. Tables 16-26 and 16-30 summarize the results of the assessment of impacts related to treatment plant operations and maintenance for roadway intersections and segments, respectively.

The results of the concurrency LOS analyses differed for several of the study intersections as compared to those reported in Table 16-26. Steps were taken to reconcile the differences in methodology and make the results more consistent. This included applying signal timing and other inputs provided by Snohomish County and comparing the calibrated Synchro traffic model intersection delay. Using the Snohomish County methodology, the SR-9/SR-522 westbound ramps were estimated to operate at LOS F conditions in year 2010 both with and without the Brightwater project. The SR-9/228th Street SE intersection is projected to operate at LOS F conditions without the project, and LOS C with the project. The SR-9/SR-524 intersection is projected to operate at LOS E both with and without the Brightwater project. Although different methodologies were used, the results of both analyses are consistent in showing that with the Brightwater project traffic, delays would decrease in comparison to the no-action scenario. As a result

of the decreased traffic and delays, the Brightwater 36-mgd treatment plant operations do not require impact fees or mitigation measures per the Snohomish County concurrency regulations. Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, presents a more detailed discussion of the concurrency analyses and regulations.

Table 16-30. Route 9 Site – Estimated P.M. Peak-Hour Traffic for Roadway Segments During Construction and Operation

Route/Segment	LOS			
	2007 No Action	2007 ^b Construction	2010 No Action	2010 Operation (36 mgd)
Route 9–195th Street Corridor				
SR-104 from Edmonds Terminal to I-5	E	E	F	F
SR-104 from 15th Avenue NE to SR-522	C	C	C	C
SR-99 south of SR-104	D	D	D	D
SR-99 north of SR-104	C	C	C	C
SR-522 east of SR-104	F	F	F	F
SR-522 west of SR-527	C	C	C	C
NE 195th Street east of Interstate 405	E	E	E	E
228th Street SE west of SR-9	C	C	C	C
228th Street SE east of SR-527	B	B	B	B
SR-9 north of SR-522 ^a	F	F	F	F
Route 9–228th Street Corridor				
SR-104 west of Interstate 5	E	E	F	F
SR-104 south of 15th Avenue NE	C	C	C	C
SR-99 south of SR-104	D	D	D	D
SR-99 north of SR-104	C	C	C	C
SR-522 east of SR-104	F	F	F	F
SR-522 west of SR-527	C	C	C	C
NE 195th Street east of Interstate 405	E	E	E	E
228th Street SE west of SR-9	C	C	C	C
228th Street SE east of SR-527	B	B	B	B
SR-9 north of SR-522 ^a	F	F	F	F

^a Does not assume WSDOT SR-9 widening project improvements are in place

^b Does not assume concurrent construction of SR-9 road improvements and treatment plant

The project will have minimal impacts to freight, transit, bicycle, and pedestrian traffic. A lower number of accidents could potentially occur as a result of the decreased traffic within the study area during operation activities. However, this relates to the potential exposure to a lesser number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

LOS analyses assuming completion of the SR-9 improvements were performed for all SR-9 intersections. Under that scenario, all intersections on Route 9 are projected to operate at LOS C or better (WSDOT standards) with the 2010 Brightwater Route 9 site operations traffic. The SR-9 roadway segment north of SR-522 is also projected to operate at LOS C.

LOS analyses assuming Costco operations were also performed for years 2007 and 2010. Intersections are projected to operate similarly to Brightwater operations conditions.

2040 Operations

In comparison to the 2010 operational conditions, two additional segments would operate within the LOS F range under the 2040 No Action Alternative: SR-99 both north and south of SR-104. All of the study intersections would operate at LOS F. The project-related trips generated by the treatment plant would not result in any changes in segment or intersection LOS compared to the No Action Alternative with the exception of SR-9/SR 522 Westbound ramps and SR-9/228th SE. In 2040, these intersections would operate at a higher level of service (LOS E instead of F) with the Brightwater project when compared to No Action because the treatment plant would generate fewer trips than existing uses at the site. Tables 16-31 and 16-32 summarize the 2040 operations LOSs, which are consistent with the No Action Alternative. The estimated traffic under 2040 conditions is shown in Figure 16-5.

The project would have minimal impacts to freight, transit, bicycle, and pedestrian traffic. A lower number of accidents could potentially occur as a result of the decreased traffic within the study area due to operation activities. However, this relates to the potential exposure to a lesser number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Table 16-31. Route 9 Site – Estimated 2040 P.M. Peak-Hour Traffic Conditions for Roadway Segments During Operation

Segment	2040 No Action LOS	2040 Operation (54 mgd) LOS
Route 9–195th Street Corridor		
SR-104, west of Interstate 5	F	F
SR-104, south of 15th Avenue NE	C	C
SR-99, south of SR-104	F	F
SR-99, north of SR-104	F	F
SR-522, east of SR-104	F	F
SR-522, west of SR-527	C	C
NE 195th Street, east of I-405	E	E
228th Street SE, west of SR-9	C	C
228th Street SE, east of SR-527	C	C
SR-9, north of SR-522 ^a	F	F
Route 9–228th Street Corridor		
SR-104, west of Interstate 5	F	F
SR-104, south of 15th Avenue NE	C	C
SR-99, south of SR-104	F	F
SR-99, north of SR-104	F	F
SR-522, east of SR-104	F	F
SR-522, west of SR-527	C	C
NE 195th Street, east of I-405	E	E
228th Street SE, west of SR-9	C	C
228th Street SE, east of SR-527	C	C
SR-9, north of SR-522 ^a	F	F

^a Does not include WSDOT SR-9 widening project

LOS analyses assuming completion of the SR-9 improvements were also performed for all SR-9 intersections. The results were similar to the 2010 conditions; however, the SR-9/SR-522 Eastbound ramps intersection would operate at LOS D by 2040.

Table 16-32. Route 9 Site and Corridors—Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation

Intersection	2040 No Action		2040 Operation (54 mgd)	
	LOS	Delay ^a	LOS	Delay ^a
Route 9–195th Street Corridor				
SR-99 at 244th Street SW	F	127	F	127
SR-104 at I-5 Southbound Off-ramp	F	118	F	118
SR-104 at 15th Avenue NE	F	168	F	168
SR-104 at SR-522	F	401	F	401
SR-522 at SR-527	F	335	F	335
SR-9 at 228th Street SE ^b	F	82	E	72
SR-9 at SR-522 Eastbound Ramps ^b	F	114	F	101
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	F	52	E	49
SR-9 at SR-524	F	185	F	171
Route 9–228th Street Corridor				
SR-522 at SR-527	F	335	F	335
SR-9 at 228th Street SE ^b	F	82	E	72
SR-527 at 228th Street SE	F	209	F	210
SR-9 at SR-522 Eastbound Ramps ^b	F	114	F	101
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	F	52	E	49
SR-9 at SR-524 ^b	F	185	F	171

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Does not assume WSDOT SR-9 widening project improvements are in place

Proposed Mitigation: Route 9 Treatment Plant

Construction Mitigation: Route 9 Treatment Plant

Mitigation measures for the Route 9 site include those that are common to both sites with the exception of a parking management plan. The Route 9 site would be provided with adequate onsite parking to accommodate construction vehicles and workers.

Analysis of the affected roadways during the peak construction period showed that the construction traffic would have minimal impact on roadway segments and intersection LOS ratings, if not constructed concurrently with the SR-9 roadway improvements. However, several study intersections would experience higher delays in comparison to the no-action scenario.

Temporary mitigation measures are proposed for key impacted intersections for the Route 9 site during construction and are summarized in Tables 16-33 and 16-34. These include temporary signal adjustments, providing flaggers and off-duty police for traffic control, and temporary restriping of impacted approach lanes. Where these measures are not adequate to mitigate the temporary impact from the Brightwater project, consideration would be given to modifying truck routes or timing of construction as described in the general mitigation section.

Table 16-33. Route 9 Site—195th Street Alternative – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-9 at SR-522 Eastbound Ramps	X	–	–
SR-9 at SR-524	X	–	–

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

Table 16-34. Route 9 Site—228th Street Alternative – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-9 at SR-522 Eastbound Ramps	X	–	–
SR-9 at SR-524	X	–	–

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

The proposed temporary mitigation measures in conjunction with the TMP and King County commitments are projected to improve intersection operations to at least the no-action levels if SR-9 improvements are not constructed concurrently. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

King County will mitigate potential construction traffic impacts to SR-9, from SR-522 to SR-524, and 228th Street SE attributable solely to construction of the Brightwater project to the greatest extent practicable, so that peak-period delay resulting from and directly attributable to Brightwater construction will be no worse than the No Action Alternative

as identified in the Brightwater Final EIS. The traffic analysis methodology to be used will be the Snohomish County traffic analysis procedures and the Synchro traffic simulation software.

Possible impacts to peak period operating conditions directly attributable to the added impact of Brightwater construction impact, as opposed to other sources of future traffic congestion, will be mitigated to the extent practicable by using one or a combination of the following three options.

1. King County could coordinate with WSDOT to expedite the SR-9 road construction to minimize or eliminate the overlap with Brightwater construction; or
2. King County could revise the timing of its traffic uses associated with Brightwater construction to the extent practicable in an effort to reduce the conflict; or
3. King County could limit or reduce vehicle traffic access to the site during peak traffic periods to the extent practicable and as possible, given the paramount need of having the Brightwater system constructed and in operation by 2010.

If Snohomish County finds during permitting that Brightwater and WSDOT project construction occurring concurrently would create significant adverse environmental impacts, after application of one or all of the mitigation measures defined above, then Snohomish County may require King County to apply additional reasonable and practicable measures to mitigate those traffic impacts attributable to the Brightwater project.

Operation Mitigation: Route 9 Treatment Plant

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals and for biosolids transport will be designated during the permitting phase.

Specific mitigation measures at the study intersections were investigated for the operational phase of the project. The mitigation measures are recommended for two categories, proposed and potential measures. Proposed mitigation addresses the operational deficiencies created by the addition of vehicles generated by the Brightwater project. These deficiencies should be mitigated by King County in conjunction with this project. Potential mitigation addresses background infrastructure deficiencies, not caused by the Brightwater project traffic. These deficiencies are noted, however, but would not be required to be addressed by the County in conjunction with the Brightwater project.

Operations at the study intersections during 2010 would not require mitigation. Table 16-35 identifies both proposed and potential mitigation actions for the Route 9 plant site during the 2040 operational phase. The majority of the study intersections during the 2040 operations are projected to operate at unacceptable LOSs without the development of the Brightwater project. All mitigation provided would be potential measures to address background traffic increases in the study area.

**Table 16-35. Route 9 Site – Intersection Mitigation Measures – 2040 P.M.
Peak-Hour Traffic during 54-mgd Operation**

Intersection	Mitigation Measures	
	Proposed	Potential
SR-9 at 228th Street SE	None	Increase cycle length to provide more green time for northbound through movement.
SR-527 at 228th Street SW	None	Provide additional northbound left- and right-turn lanes; Provide additional eastbound left-turn and through lanes; Optimize signal timing.
SR-9 at SR-522 Eastbound Ramps	None	Provide additional eastbound left-turn lane.
SR-9 at SR-522 Westbound Ramps (Unsignalized)	None	Signalize intersection.

Upon completion of the proposed SR-9 capacity improvement project, the above SR-9 mitigation would not be required.

16.3.2.2 Conveyance–Route 9 System

Construction Impacts: Route 9–195th Street Corridor

Primary Portals

A straight-line growth factor of 1 percent per year was applied to the study intersection's existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the regional model forecasts and historical traffic growth. The results of the intersection analysis are shown in Tables 16-36 through 16-40.

Peak construction activities for the entire Brightwater project are projected to occur during 2007. The peak portal construction truck traffic was added to the cumulative peak traffic of the entire project (2007) to provide the most conservative, or worst-case, scenario. The peak construction activities for the primary portals are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Portal 5

The additional construction traffic is projected to slightly increase delays at the study intersections. The LOS for both intersections is projected to remain the same as the No Action conditions.

SR-104 and 15th Avenue NE within the construction route of Portal 5 are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to

physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected. On-street parking on 15th NE may be affected during Portal 5 construction activities.

Ballinger Terrace Shopping Center is located within the Portal 5 siting area off of Ballinger Way NE (SR-104). A private elementary school is located southeast of the Portal 5 siting area near Ballinger Way NE and 19th Avenue NE. Vehicular and non-motorized access to the shopping center and school may be affected.

Table 16-36. Route 9–195th Street Corridor, Portal 5 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site X		Sites B/G	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104 at 15th Avenue NE	66	E	69	E	69	E
SR-104 at I-5 SB Off-ramp	32	C	33	C	33	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 11

The additional construction traffic would have minimal effects on the study intersections. All intersections would operate similarly to the no-action scenario.

Table 16-37 shows predicted construction impacts in the event that the City of Kenmore's SR-522 multimodal corridor project Phase I is not completed prior to the peak Brightwater construction period. If Kenmore's project is completed, intersection conditions would improve as follows: The SR-522/68th NE intersection would operate at LOS E (58 s/v) under the No Action Alternative, LOS E (60 s/v) for portal sites A and B, and LOS E (62 s/v) for Portal site C. The 68th NE/NE 181st intersection would operate at LOS B for all alternatives.

Table 16-37. Route 9–195th Street Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site A		Site B		Site C	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-522 at 68th Avenue NE	118	F	122	F	122	F	127	F
SR-522 at SR-527	88	F	92	F	92	F	92	F
68th Avenue NE at NE 175th Street	17	B	17	B	17	B	17	B
68th Avenue NE at NE 181st Street, northern T	9	A	9	A	9	A	9	A
68th Avenue NE at NE 181st Street, Rite-Aid Driveway	13	B	13	B	13	B	13	B

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-522 and 68th Avenue NE within the Portal 11 construction route are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected. On-street parking on 15th NE may be affected during construction activities.

NE 175th Street may experience adverse impacts to pavement from Portal 11 construction vehicle traffic. Additionally, it is not furnished with sidewalks and/or bike lanes; therefore, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles. On-street parking may also be affected during construction operations.

A Park-n-Ride lot is located near NE 182nd Street and 68th Avenue NE, north of the portal site. Also north of the Portal 11 site is City Hall, near NE 181st Street and 68th Avenue NE. Vehicular and non-motorized access to the Park-n-Ride and City Hall may be affected.

Portal 19

The additional construction traffic is projected to have a minimal effect on the study intersections during both the morning and afternoon peak hours. All of the intersections are projected to operate at similar levels to the no-action scenario.

N 185th Street, NW Richmond Beach Road, and NW 195th Street within the Portal 19 construction route are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

SR-99 within the Portal 19 construction route is characterized by fair pavement conditions and may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles on SR-99, NW 196th Street and Richmond Beach Drive NW, which have no specified pedestrian amenities.

Table 16-38. Route 9–195th Street Corridor, Portal 19 – Estimated 2007 Intersection Peak-Hour Traffic During Construction^a

Intersection	No Action		Site A		Site C (preferred)		Site E	
	Delay ^b	LOS	Delay ^b	LOS	Delay ^b	LOS	Delay ^b	LOS
A.M. Peak Hour								
N 185th Street at SR-99	64	E	76	E	76	E	76	E
NW Richmond Beach Rd at 8th Ave NW	32	C	34	C	34	C	34	C
Richmond Beach Drive NW at NW 196th Street	9	A	9	A	9	A	9	A
P.M. Peak Hour								
N 185th Street at SR-99	82	F	88	F	88	F	88	F
NW Richmond Beach Rd at 8th Ave NW	38	D	39	D	39	D	39	D
Richmond Beach Drive NW at NW 196th Street	9	A	10	A	10	A	10	A

^a Cumulative impacts with Zone 7S outfall construction assumed for analysis

^b Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 41

The additional construction traffic would impact the study intersections as shown in Table 16-39. The LOS of the study intersections are projected to remain similar to the No Action conditions with the exception of the Beardslee Boulevard/Ross Road intersection, in the City of Bothell, which would operate at LOS F conditions in conjunction with site W. The NE 195th Street/North Creek Parkway intersection would also result in an LOS change from D to E with Site X.

NE 195th Street, 120th Avenue NE, and North Creek Parkway within the Portal 41 construction route are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

The North Creek Sportsfields are located to the south of the portal siting area, between North Creek Parkway and 120th NE. Vehicular and non-motorized access to the fields may be affected.

An influent pump station may be constructed at Portal 41. Construction of the pump station would be in addition to Portal 41 construction (see influent pump station discussion in Section 16.3.2.2). The additional trips from the pump station would be very low and would have little effect on the results shown.

Table 16-39. Route 9–195th Street Corridor, Portal 41 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction^{b,c}

Intersection	No Action		Sites A/J		Site C		Site D		Site W		Site X	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp at NE 195th Street	36	D	41	D	41	D	41	D	37	D	41	D
I-405 SB Ramp at NE 195th Street	24	C	25	C	25	C	25	C	26	C	25	C
NE 195th Street at North Creek Parkway	51	D	52	D	52	D	52	D	51	D	66	E
NE 195th Street at 120th Avenue NE	91	F	91	F	111	F	97	F	91	F	91	F
Beardslee Blvd at Ross Road	21	C	21	C	21	C	21	C	416	F	21	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Cumulative impacts with Microtunnel construction assumed for analysis.

^c Cumulative impacts for Option IPS at Portal 41 not assumed for this analysis, however the additional trips from the IPS would have little affect on these results.

Portal 44

The additional construction and connecting to existing sewer line traffic is projected to have minimal effects on the study intersections, with the exception of 80th Avenue NE/NE 195th Street. Operations at this intersection are expected to decline to LOS E for two portal sites, which is still within acceptable levels as defined by the City of Kenmore.

80th Avenue NE and NE 195th Street may experience adverse impacts to pavement from Portal 44 construction vehicle traffic. Additionally, they are not furnished with sidewalks and/or bike lanes; therefore, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles. Pedestrians may also be impacted on SR-522, south of 96th Avenue NE. This area is characterized by narrow shoulders along the roadway.

Westhill Park is located to the east of the Portal 44 siting area, off of NE 195th Street. Vehicular and non-motorized access to the park may be affected.

Table 16-40. Route 9–195th Street Corridor, Portal 44 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site C		Site D		Site E	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-522 at SR-527	88	F	92	F	92	F	92	F
80th Avenue NE at SR-522	59	E	67	E	67	E	67	E
80th Avenue NE at NE 195th Street (Unsignalized)	19	C	39	E	39	E	19	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Secondary Portals

A straight-line growth factor of 1 percent per year was applied to the study intersection's existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the regional model forecasts and historical traffic growth. The results of the intersection analysis are shown in Table 16-41.

Construction of the secondary portals, if needed, is expected to peak in 2007. The secondary portal, if required, would generate an average of three trucks per day, and would not affect peak-hour traffic operations.

The estimated construction trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total construction traffic volumes.

The additional construction traffic in the vicinity of the secondary portals would have minimal effects on the study intersections as shown in Table 16-41. All intersections would operate similarly to the no-action scenario.

Table 16-41. Route 9–195th Street, Secondary Portals – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Portal 45	No Action		Site A		Site C		Site D	
SR-522 at SR-527	88	F	92	F	92	F	92	F
SR-522 at 80th Avenue NE	59	E	67	E	67	E	67	E
SR-522 at 68th Avenue NE	118	F	122	F	122	F	122	F
Portal 7	No Action		Site A		Site B		Site C	
SR-104 at 25th Avenue NE	31	C	31	C	31	C	31	C
SR-104 at 15th Avenue NE	66	E	69	E	69	E	69	E

Table 16-41. Route 9–195th Street, Secondary Portals – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction (cont.)

Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104 at I-5 Southbound Ramps	32	C	33	C	33	C	33	C
Portals 27 and 23^b	No Action		Site A		Site D		Site F	
SR-104 at I-5 Southbound Ramps	32	C	33	C	33	C	33	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Same intersection for both portals

Portal 41 Influent Pump Station Option

Construction of the IPS at Portal 41 would occur over a 2-year period, with peak construction activities occurring in the first 18 months, producing an average of 28 daily truck trips. The number of truck trips would gradually decline over the last 6 months of the 2-year construction period as activities shift from excavation and concrete wall construction to finishing and landscape work. The estimated construction activity would be in addition to the Portal 41 construction trips. Other construction-related transportation impacts, such as access and pedestrian circulation, are similar to those described for portal construction. Ingress and egress of construction vehicles at the pump station site would result in increased delays in circulation in the vicinity of the work site.

If the IPS is constructed at the Portal 41 location, the construction trips at the Route 9 Treatment Plant Site would be reduced by the number described above (i.e., an average of 28 daily truck trips).

Intersection LOS is expected to be similar to the Portal 41 and the Route 9 Site analyses described previously, because the difference in peak hour trips is very small.

Connections to Existing Sewers

Additional construction activity to connect existing sewer lines to the Route 9 conveyance tunnel would occur in the vicinity of Portals 44, 41, and 11. These pipeline connections would be accomplished with short open cut or microtunneling construction methods on land areas adjacent to and off of the existing roadway system. Occasionally, truck access would be accomplished with flaggers. When construction occurs at roadways, at least one lane in each direction would be maintained. Any traffic control plans would be coordinated with local jurisdictions and emergency service providers. Microtunneling construction would result in no effects on roadways except at the microtunnel pit locations.

Operation Impacts: Route 9–195th Street Corridor

Primary Portals

For all primary portals, since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access, pump station, dechlorination, odor control, and/or ventilation facilities that may be constructed at the portal locations. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Additional facilities, including hydraulic control structures, pump stations, odor control, chemical injection, effluent quality sampling, or dechlorination facilities are included with Portals 5, 11, 19, 41, and 44. The additional facilities would generate approximately two trips per week for maintenance and inspections.

Secondary Portals

For all secondary portals, since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 41 Influent Pump Station Option

Traffic trips for IPS operation would include four to eight chemical truck trips per month with all occurring during non-peak hours, four operations vehicle trips per day with two occurring during peak hours, four maintenance vehicle trips per day with all occurring during non-peak hours, and four to eight maintenance truck trips per month most likely occurring during non-peak hours. These trips are not expected to contribute significantly to overall traffic volumes. No transportation-related impacts would result with the operation of the IPS at Portal 41.

Operation Mitigation: Route 9–195th Street Corridor

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during operation and maintenance of any permanent pump station, dechlorination, tunnel access, odor control, and/or ventilation facilities. Therefore, mitigation for operation of the conveyance system is not proposed.

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals would be

designated during the permitting phase. These routes would be determined upon selection of preferred sites for the portals.

Primary Portals

Construction Mitigation: Route 9–195th Street Corridor

The study intersections surrounding the potential portal sites, and construction routes showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All study intersections would operate at the same LOS as the "no-action" conditions with the exception of three intersections. With additional trips created by the construction of Portal 44, 80th Avenue NE/NE 195th Street would change from LOS C to LOS E for two of the three potential portal sites (sites C and D). With the construction of Portal 41, NE 195th Street/North Creek Parkway would change from LOS D to E for portal site X. Beardslee Boulevard/Ross Road would decline from LOS C to F for site W.

Temporary intersection mitigation is proposed in Table 16-42 for the Route 9–195th Street corridor during construction. The proposed temporary mitigation measures are projected to improve intersection operations to at least the no-action levels. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

Table 16-42. Route 9–195th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-104 at 15th Avenue NE	X	–	X
SR-522 at SR-527	X	–	X
SR-522 at 68th Avenue NE	X	–	X
SR-99 at N 185th Street	X	–	X
NE 195th Street at 120th Avenue NE	X	X	X
NE 195th Street at North Creek Parkway	X	X	X
80th Avenue NE at NE 195th Street (Unsignalized)	–	X	X
SR-9 at SR-522 Eastbound Ramps	X	–	–
SR-9 at SR-524	X	–	–
Beardslee Boulevard at Ross Road (Unsignalized)	X	X	X

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

Specific locations for mitigation along the construction routes were also identified (Table 16-43) based on the existing roadway conditions and geometry. All construction routes would be subject to the full TMP and mitigation measures; however, based on existing conditions, the locations in Table 16-43 should be monitored.

**Table 16-43. Route 9—195th Street Corridor –
Construction Route Mitigation Measures**

Construction Route ^a	Proposed Mitigation Measures		
	Pavement Conditions	Non-motorized Facilities	On-street Parking
SR-522	—	X	—
68th Avenue NE	—	—	—
NE 175th Street	X	X	X
80th Avenue NE	X	X	—
NE 195th Street	X	X	—
NE 120th Avenue	—	—	—
North Creek Parkway	—	—	—
SR-104	—	—	—
15th Avenue NE	—	—	X
SR-99	X	X	—
N 185th Street	—	—	—
NW Richmond Beach Road	—	—	—
NW 195th Street	—	—	—
NW 196th Street	—	X	—
Richmond Beach Drive	—	X	—

X This denotes mitigation measure is proposed.

— This denotes mitigation measure is not proposed.

^a Roadway sections vary within the corridor; thus, the issue may not apply to the entire roadway

If needed for mitigating construction-related transportation impacts, King County would evaluate the potential for co-use of the existing ChevronTexaco dock at Point Wells for Portal 19, including appropriate environmental review.

Secondary Portals

Construction Mitigation: Route 9—195th Street Corridor

The study intersections surrounding the potential secondary portal sites, and their construction routes, showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All secondary portal sites would operate at the same LOS as the no-action conditions, therefore, no mitigation is proposed.

Operation Mitigation: Route 9–195th Street Corridor

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during operation and maintenance of any permanent tunnel access. Therefore, mitigation for operation of the conveyance system is not proposed.

*Portal 41 Influent Pump Station Option**Construction Mitigation: Portal 41 Influent Pump Station*

While construction of the portal and pump station would occur concurrently, major excavation activities for these two facilities would be accomplished at different times to reduce cumulative traffic impacts. To the extent practicable, materials may be stockpiled at the site to accommodate hauling during off-peak hours. King County will work with the City of Bothell to determine appropriate haul routes and timing for truck hauling activity to minimize traffic impacts, as well as coordinate with noise and light mitigation. Mitigation measures to reduce other transportation impacts are the same as for portal construction at Portal 41.

Operation Mitigation: Portal 41 Influent Pump Station

No transportation-related impacts would result with the operation of the IPS at Portal 41.

16.3.2.3 Conveyance–228th Street Corridor**Construction Impacts: Route 9–228th Street Corridor***Primary Portals*

A straight-line growth factor of 1 percent per year was applied to the study intersection's existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the regional model forecasts and historical traffic growth. The results of the intersection analysis are shown in Tables 16-37 (for Portal 11), 16-40 (for Portal 44), 16-38 (for Portal 19), and the following Tables 16-44 and 16-45.

Estimated project construction trips are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Table 16-44. Route 9–228th Street Corridor, Portal 41 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Sites A/J		Site C		Site D		Site W		Site X	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp at NE 195th Street	36	D	37	D	37	D	37	D	36	D	37	D
I-405 SB Ramp at NE 195th Street	24	C	25	C	25	C	25	C	24	C	25	C
NE 195th Street at North Creek Parkway	51	D	51	D	51	D	51	D	51	D	57	E
NE 195th Street at 120th Avenue NE	91	F	91	F	99	F	92	F	91	F	91	F
Beardslee Blvd at Ross Road	21	C	21	C	21	C	21	C	114	F	21	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 16-45. Route 9–228th Street Corridor, Portals 39, 33, 26 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Portal 39	No Action		Site B		Site C		Site D	
I-405 NB Ramp at SR-527	46	D	46	D	46	D	46	D
I-405 SB Ramp at SR-527	24	C	24	C	24	C	24	C
228th Street SW at SR-527	58	E	64	E	64	E	64	E
Portal 33	No Action		Site A		Site C		Site D	
I-405 NB Ramp at SR-527	46	D	46	D	46	D	46	D
I-405 SB Ramp at SR-527	24	C	24	C	24	C	24	C
228th Street SW at SR-527	58	E	64	E	64	E	64	E
228th St SW at 14th Ave W	16	B	18	B	18	B	18	B
228th St SW at Locust Way	12	B	12	B	12	B	12	B
Portal 26	No Action		Site A		Site C		Site D	
224th Street SW/SR-99	36	D	36	D	36	D	36	D
224th St SW at 73rd Ave W	11	B	11	B	11	B	11	B
228th St SW at 73rd Ave W	14	B	15	C	14	B	15	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 41

Portal 41 is common to both the 195th Street and 228th Street corridors, and the non-LOS impacts are described in the 195th Street Conveyance section above.

Portals 39 and 33

The additional construction traffic is projected to have a minimal effect on the study intersections. LOS is projected to remain the same as the no-action scenario.

SR-527 within the construction routes to Portals 39 and 33 is characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

Portions of 228th Street SW may experience adverse impacts to pedestrians and non-motorized vehicles where existing facilities are not available, and they may be required to share the roadway with construction vehicles.

Locust Way may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles because sidewalks and bike lanes are absent from the affected segments of Locust Way.

Portal 26

The additional construction traffic is projected to have a minimal effect on the study intersections. LOS is projected to remain at LOS C or better levels.

Portions of 73rd Avenue W, 224th Street SW, and 228th Street SW along the construction route to Portal 26 may experience adverse impacts to pedestrians and non-motorized vehicles where existing facilities are not available, and they may be required to share the roadway with construction vehicles. On-street parking may also be affected by construction operations.

Ballinger Park is located south of the portal siting area along Lakeview Drive. Vehicular and non-motorized access to the park may be affected.

Secondary Portals

A straight-line growth factor of 1 percent per year was applied to the study intersections' existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the regional model forecasts and historical traffic growth. The results of the intersection analysis are shown in Tables 16-46 and 16-47.

Construction of secondary portals, if needed, is expected to peak in 2007 and would generate an average of three trucks per day. It would not affect peak-hour traffic operations.

The estimated construction trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction related traffic from surrounding portals and/or treatment plant facilities were included in the total construction traffic volumes. Secondary Portals 30 and 24 were not analyzed as both would have minimal construction impacts. This is because no primary portal-related or treatment plant site-related construction traffic would pass through their siting areas.

The additional construction traffic is projected to have a minimal effect on the study intersections in the vicinity of the secondary portal sites. LOS is projected to remain the same as the no-action scenario.

Table 16-46. Route 9–228th Street Corridor, Portal 37 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site A		Site C		Site D	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 Northbound Ramp at SR-527	46	D	46	D	46	D	46	D
I-405 Southbound Ramp at SR-527	24	C	24	C	24	C	24	C
SR-527 at 228th Street SE	58	E	64	E	64	E	64	E

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 16-47. Route 9–228th Street Corridor, Portal 22 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site A		Site C		Site D		Site E		Site F	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104 at I-5 SB Ramps	32	C	33	C	34	C	34	C	34	C	34	C

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 41 Influent Pump Station Option

The impacts associated with the Route 9–228th Street corridor IPS Option are the same as those described for the Route 9–195th Street corridor IPS Option above, although due to the slight difference in the depth of the alignment and corresponding reduction in the volume of earthwork for the construction of the IPS at Portal 41, there will be a slight reduction in the number of truck trips required for construction of the IPS at Portal 41 under the Route 9–228th Street alternative.

Connections to Existing Sewers

The impacts associated with the Route 9–228th Street corridor connections to existing sewer lines are the same as those described for the Route 9–195th Street corridor Connections to Existing Sewers above.

Operation Impacts: Route 9–228th Street Corridor***Primary Portals***

Since the completed conveyance system would be largely below ground for all primary portals, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Additional facilities, including hydraulic control structures, pump stations, odor control, chemical injection, or dechlorination facilities, are included with Portals 11, 19, 26, 41, and 44. The additional facilities would generate approximately two trips per week for maintenance and inspections.

Secondary Portals

Since the completed conveyance system would be below ground for all secondary portals, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Proposed Mitigation: Route 9–228th Street Corridor

The proposed mitigation is consistent with the measures described above under Mitigation in the section entitled Proposed Mitigation Common to All Systems.

Construction Mitigation: Route 9–228th Street Corridor***Primary Portals***

In addition to the mitigation common to all systems for conveyance, a potential co-use of the Chevron Richmond Beach Asphalt Terminal at Point Wells for transporting excavation spoil and construction materials may be considered to alleviate a portion of the construction traffic at Portal 19.

The study intersections surrounding the potential primary portal sites and their construction routes showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All study intersections would

operate at the same LOS as the no-action conditions with the exception of three intersections. With additional trips created by the construction of Portal 44, the intersection of 80th Avenue NE/NE 195th Street would change from LOS C to LOS E for two of the three potential portal sites (Sites C and D). With the construction of Portal 41, the NE 195th Street/North Creek Parkway intersection would change from LOS D to E for portal site X. The Beardslee Boulevard/Ross Road intersection would decline from LOS C to F for site W. Temporary intersection mitigation is proposed in Table 16-48 during construction. The proposed temporary mitigation measures are projected to improve intersection operations to at least the no-action levels. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

Table 16-48. Route 9—228th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-522 at SR-527	X	—	X
SR-522 at 68th Ave NE	X	—	X
SR-99 at N 185th Street	X	—	X
NE 195th Street at 120th Avenue NE	X	X	X
NE 195th Street at North Creek Parkway	X	X	X
80th Avenue NE at NE 195th Street (Unsignalized)	—	X	X
SR-9 at SR-522 Eastbound Ramps	X	—	—
SR-9 at SR-524	X	—	—
Beardslee Boulevard at Ross Road (Unsignalized)	X	X	X

X This denotes mitigation measure is proposed.

— This denotes mitigation measure is not proposed.

Specific locations for mitigation along the construction routes were also identified (Table 16-49) based on the existing roadway conditions and geometry. All construction routes would be subject to the full TMP and mitigation measures; however, based on existing conditions, the locations in Table 16-49 should be monitored.

**Table 16-49. Route 9—228th Street Corridor –
Construction Route Mitigation Measures**

Construction Route ^a	Proposed Mitigation Measures		
	Pavement Conditions	Non-motorized Facilities	On-street Parking
SR-522	–	X	–
68th Avenue NE	–	–	–
NE 175th Street	X	X	X
80th Avenue NE	X	X	–
NE 195th Street	X	X	–
NE 120th Avenue	–	–	–
North Creek Parkway	–	–	–
SR-527	–	–	–
228th Street SW	–	X	X
224th Street SW	–	X	X
Locust Way	X	X	–
73rd Avenue W	–	X	X
SR-99	X	X	–
N 185th Street	–	–	–
NW Richmond Beach Road	–	–	–
NW 195th Street	–	–	–
NW 196th Street	–	X	–
Richmond Beach Drive NW	–	X	–

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

^a Roadway sections vary within the corridor; thus, the issue may not apply to the entire roadway

Secondary Portals

The study intersections surrounding the potential portal sites, and their construction routes showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All portal sites would operate at the same LOS as the "no-action" conditions. Thus, no additional mitigation is recommended for these portals.

Operation Mitigation—Route 9 228th Street Corridor

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals would be designated during the permitting phase. These routes would be determined upon selection of preferred sites for the portals.

Primary Portals

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during operation and maintenance of any permanent pump station, dechlorination, tunnel access, odor control, and/or ventilation facilities. Therefore, mitigation for operation of the conveyance system is not proposed.

Secondary Portals

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during operation and maintenance of any permanent tunnel access. Therefore, mitigation for operation of the conveyance system is not proposed.

16.3.2.4 Outfall—Route 9**Construction Impacts: Route 9 Outfall**

Construction activity at Zone 7S would take place near the Chevron Richmond Beach Asphalt Terminal at Point Wells. Marine construction vessel traffic would be coordinated with vessels accessing the Chevron Richmond Beach Asphalt Terminal and is not expected to significantly impact Chevron's commercial activities. Location of recreational fishing and boating activities near Zone 7S, such as fishing derbies or yacht races, would likely be altered during construction of the marine outfall.

For onshore construction in Zone 7S, the total number of truck trips is estimated at about 1,000 for removal of excavated material, and 1,000 for delivery of construction materials (backfill and pipeline segments) for outfall pipeline installation. For nearshore construction, the total number of barge trips is estimated at 13 for removal of excavated material, and 14 for backfill and pipeline segment delivery. The truck and barge trip estimates assume a typical truck capacity of 16 cubic yards (cy) and a typical barge capacity of 1,500 cy. Excavation and backfill material volumes are discussed in Chapter 4.

The anticipated duration of onshore trench construction is 1 to 2 months; thus, 22 to 46 truck trips per day would be required for removal of onshore excavated soils. Pipe segments and backfill materials are likely to be delivered to the plant site staging area over a period of 2 to 3 months prior and/or during construction. Fifteen to 23 truck trips per day would be required for delivery of materials over that time period. Truck traffic impacts are included in those described for conveyance construction from Portal 19.

The anticipated duration of nearshore trench construction is 2 to 3 months; thus, 4 to 7 barge trips per month would be required for removal of in-water excavated soils. Four to 7 barge trips would be required for backfill material and pipeline segment delivery during installation of the nearshore trench. Barge traffic would use the U.S. Coast Guard

established maritime traffic lanes for the removal of excavated material and delivery of construction materials. Barge traffic for construction of the marine outfall would be coordinated with affected tribal governments and with ChevronTexaco officials so that marine traffic accessing the Chevron Richmond Beach Asphalt Terminal is not interrupted.

Peak construction of the Zone 7S outfall was assumed to occur concurrently with the Portal 19 peak construction period. Therefore, the Zone 7S outfall transportation impacts were incorporated with the Route 9 Portal 19 analyses.

Operation Impacts: Route 9 Outfall

Normal operation of the marine outfall would not impact marine transportation within Zone 7S. The outfall pipeline will be buried below the seabed to a water depth of approximately -80 feet MLLW. Below this depth the pipeline will be laid directly on the seabed. There would be no above-water or near-surface structures that could impact vessel traffic, nor would there be any restrictions on anchoring as a result of the outfall.

Land transportation would not be impacted by operation and maintenance of the outfall. Regular maintenance requirements for the outfall pipelines include cathodic protection monitoring of steel pipelines and periodic inspection. Inspection and maintenance of the cathodic protection system would be performed periodically by King County staff and would not require equipment that would impact marine transportation.

It is anticipated that visual inspection of the pipeline would be performed by divers and/or a remotely operated vehicle (ROV) approximately every 5 years and after any significant seismic event. Inspection activities would occur below the water surface and would be supported by one or more surface vessels. Inspection vessels would not interfere with commercial or recreational maritime traffic.

Proposed Mitigation: Route 9 Outfall

Construction Mitigation: Route 9 Outfall

Construction vessel traffic and activities would be coordinated with ChevronTexaco and tribal government officials to reduce interference with Chevron Richmond Beach Asphalt Terminal operations and tribal fishing. Truck traffic mitigation measures would be followed as described for Portal 19 construction.

Operation Mitigation

Vessels involved in the periodic inspection of the outfall pipeline would be marked and lighted in accordance with applicable U.S. Coast Guard regulations so that operators of other vessels would be alerted to their presence and operating status. Outfall operation would not have impacts on land transportation systems.

16.3.3 Impacts and Mitigation: Unocal System

16.3.3.1 Treatment Plant: Unocal

Construction Impacts: Unocal Treatment Plant

Transportation System

As part of the construction effort, Pine Street would need to be realigned to maintain access between Edmonds and Woodway during and after construction on the Unocal site. The street would be realigned to the south along the Unocal property line and would run due west from its intersection with SR-104 without the current bend to the north. Retaining walls would be constructed to stabilize the slope after excavation. The roadway section and grade requirements would be constructed to county and city roadway design standards, and it would take approximately 4 to 6 months to complete. During this construction period, construction vehicles would occasionally travel with neighborhood traffic to access the construction area. Flaggers would be onsite to assist all site access and minimize conflicts and traffic delays.

Access between Edmonds and Woodway and for emergency vehicles would be maintained at all times during construction of this new roadway segment. After completion of the newly realigned Pine Street, local neighborhood traffic would be rerouted permanently to the new roadway. The realignment is not expected to cause any changes in intersection operating LOS or long delays during peak traffic conditions.

Construction Traffic Impact Analysis (2007)

Construction of the initial 36-mgd treatment plant and conveyance corridors would be completed over approximately 4 to 6 years, with an assumed completion date of 2010. Heavy construction at the treatment plant site, such as major earthwork excavation and concrete placement for construction of tanks and structures, would likely occur in the first 2 to 3 years; thus, the greatest impacts would occur during this time (See Section 16.2.1.3 for construction vehicle classifications). During 2007, which represents the peak construction period, traffic along the site access route would increase by nearly 690 daily truck trips (one-way trips). Approximately 117 of these daily trips would occur during the afternoon peak hours of the construction period. Additional traffic associated with the treatment plant portal and Zone 6 outfall construction would also be added to the roadway network. These construction activities would generate approximately 134 daily (19 peak-hour) vehicle trips. This peak construction traffic is assumed to occur at the same time as the p.m. peak-hour period of the surrounding roadway network system and thus is used for the traffic operating LOS analysis to assess the worst-case traffic operating conditions.

Figure 16-6 illustrates the 2007 background and construction traffic volumes and routes of access to the Unocal treatment plant site.

Potential impacts on the area transportation system would be related mainly to increased traffic volumes associated with earthwork and material delivery. (See Attachment A to Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance). Adequate space for construction worker parking is not expected to be available at or near the Unocal site. It is assumed that, as a mitigation measure, shuttle buses would transport workers to the site from a remote parking location. (See Attachment B to Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance). Although the number of trips generated by construction would be substantial, its effect on traffic operations and LOS is dependent on overall background traffic in the system. Under the worst-case scenario, additional trips associated with the most intense site construction activity represent approximately a 4 percent increase in peak-hour and daily traffic along SR-104 west of SR-99. Table 16-50 shows future conditions with and without the project. Intersection LOS is projected to change slightly from baseline conditions. Two intersections would experience drops in LOS. SR-104/100th Avenue W would change from LOS E to F during construction activities; and SR-104/I-5 southbound ramps would change from LOS C to LOS D.

Table 16-50. Unocal Site and Corridor – Estimated Intersection P.M. Peak-Hour Traffic During Construction and Operation^b

Intersection	2007 No Action		2007 Construction		2010 No Action		2010 Operation (36-mgd)	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
SR-104 at Dayton Street	B	15	B	15	B	16	B	16
SR-104 at Pine Street (Unsignalized)	C	17	C	17	C	18	C	18
SR-104 at 100th Avenue W	E	60	F	86	E	66	E	67
SR-99 at 244th Street SW	E	58	E	59	E	63	E	63
SR-104 at I-5 Southbound Off-ramp	C	32	D	44	D	36	D	37
SR-104 at 15th Avenue NE	E	66	E	75	E	73	E	73
SR-104 at SR-522	F	212	F	212	F	229	F	229
SR-522 at SR-527	F	88	F	89	F	105	F	105

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Analyses represent cumulative impacts of plant, outfall and portal construction.

The segment traffic operation analysis results are listed in Table 16-51. The operations analyses show the differences for the three potential offsite parking areas; two of the candidate sites (Parcels P1 and P2) are in the vicinity of the Interstate 5/SR-104 Interchange. Access to both of these sites would be via 60th Avenue West/Gateway Place. The third site (P3) is located along 236th Street SW near SR-99. A more detailed discussion of the off-site parking analyses is contained in Attachment B to Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Table 16-51. Unocal Site and Corridor – Estimated P.M. Peak-Hour Traffic for Roadway Segments During Construction and Operation

Segment	Level of Service (LOS)				
	2007 No Action	2007 Construction		2010 No Action	2010 Operation (36 mgd)
		Offsite parking parcels #1 & #2	Offsite parking parcels #3		
SR-104, north of Pine Street	B	B	B	B	B
SR-104 north of 100th Ave W	C	C	C	C	C
SR-104, north of SR-99	B	B	B	B	B
SR-104, west of Interstate 5	E	F	F	F	F
SR-104, south of 15th Ave NE	C	C	C	C	C
SR-99, south of SR-104	D	D	D	D	D
SR-99, north of SR-104	C	C	C	C	C
SR-522, east of SR-104	F	F	F	F	F
SR-522, west of SR-527	C	C	C	C	C
NE 195th Street east of I-405	E	E	E	E	E

In addition to these traffic impacts, access by pedestrians and bicyclists may occasionally be impeded by construction-related traffic. A higher number of accidents could potentially occur as a result of the increased traffic within the study area due to construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Unocal Structural Lid Sub-Alternative

A sub-alternative was considered to account for the impact of a structural lid that has been proposed to be built over the Unocal Treatment Plant. The lid would be the foundation for Edmonds Crossing, a multimodal transportation facility that would share the Unocal site. The total construction traffic of the lid sub-alternative would peak by year 2008, however, the construction truck trips would likely peak in the earlier stages of construction, in year 2006. For comparison purposes, the traffic analysis for the treatment plant with the structural lid was conducted for the peak construction year of 2007 to be consistent with the site and portal analyses. The analysis includes construction of the plant and the lid.

The total estimated daily construction trips to the Unocal site during the study year (2007) of construction were slightly lower with the lid than without it. With the lid, approximately 742 daily and 145 p.m. peak-hour trips were estimated. While concrete, material, field staff, and shuttle bus trips would increase with the lid, intersection and roadway operations would be similar either way. In 2008, the daily concrete truck volume is 148 one-way trips and the daily earthwork truck volume is 188 one-way trips. In year 2006, daily concrete truck volumes would reach 120 one-way trips and daily earthwork truck volumes would be 600 one-way trips. These volumes in the early stages of construction would cause traffic conditions to be somewhat worse than reported for the

peak condition. However, the proposed mitigation measures would accommodate that additional traffic.

Trips to the offsite parking facility are estimated to increase significantly with construction of the lid. Approximately 1,254 daily construction worker trips (627 p.m. peak hour) are projected. The increase in construction workers would require that at least two candidate parcels be used together for remote worker parking. As a result, the intersection and roadway impacts would be greater surrounding those parcels. Intersection LOS would likely decline in the immediate vicinity of the remote parking facilities.

Effect of Concurrent Construction (Edmonds Crossing)

Another option is construction of the treatment plant, the structural lid, and the Edmonds Crossing facility on top of the lid, all peaking concurrently. A traffic analysis was conducted to estimate the impact of this scenario.

Peak construction of Edmonds Crossing would generate an additional 341 daily (138 p.m. peak-hour) trips to the Unocal site. Approximately 250 daily (125 p.m. peak-hour) trips would be associated with construction worker vehicles.

As shown in Table 16-52, delays are projected to increase slightly at the study intersections; however, LOS levels are projected to remain the same as with the treatment-plant-and-lid-construction-only scenario. Segment LOS is also projected to remain the same.

Table 16-52. Unocal Site and Corridor – Estimated Intersection P.M. Peak-Hour Traffic with Concurrent Edmonds Crossing Construction^b

Intersection	2007 No Action		2007 Treatment Plant and Structural Lid Construction		2007 Treatment Plant and Structural Lid Construction with Edmonds Crossing	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
SR-104 at Dayton Street	B	15	B	15	B	19
SR-104 at Pine Street (unsignalized)	C	17	C	17	C	19
SR-104 at 100th Avenue W	E	60	F	86	F	102
SR-99 at 244th Street SW	E	58	E	59	E	59
SR-104 at I-5 Southbound Off-Ramp	C	32	D	44	D	48
SR-104 at 15th Avenue NE	E	66	E	75	E	75

^aAverage delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^bAnalyses represent cumulative impacts of plant, outfall and portal construction.

Operation Impacts: Unocal Treatment Plant

As with the Route 9 alternative, different stages of the project were evaluated for the Unocal treatment plant site: 36 mgd capacity and 54 mgd. The 36 mgd level represents operation and maintenance conditions by 2010, while the 54 mgd represents conditions in 2040. Two sub-alternatives relating to the Unocal site have also been evaluated. One involves treating flows from the Cities of Edmonds and Lynnwood and expanding the capacity of the plant to 72 mgd by 2040. The other involves building the structural lid over a portion of the plant site that would accommodate Edmonds Crossing. The lid sub-alternative could be incorporated into the design and construction of either the 54-mgd plant or the 72-mgd sub-alternative; however, for the purpose of this evaluation, the 54-mgd plant was evaluated with the multimodal facility.

Each trip represents one direction of a round trip, inbound or outbound. The 36-mgd facility would generate 140 total trips per day, including 120 employee trips, 6 biosolids/grit truck trips, 4 chemical truck trips, and approximately 10 visitor trips. For worst-case analysis, afternoon peak-hour trips would total 44, with 2 of those being truck trips. By 2040, at 54 mgd, daily trip generation would total 206, with 60 trips occurring in the p.m. peak hours. In the 72-mgd scenario, daily trip generation would total 262, with 82 occurring during the p.m. peak.

The number of employees at the treatment plant would range from 50 (36 mgd) to 100 (72 mgd). Two work shifts are projected, with the maximum number of employees during the day shift at 39 to 65 people, including process, administration, maintenance, and coordinator.

2010 Operations

Few potential operational impacts are anticipated for the Unocal treatment plant site. The project would result in a minimal increase as a percentage of the total traffic along the routes used to access the site. Table 16-50 shows future conditions with and without the project. Intersection LOS is projected to remain the same as the No Action Alternative conditions.

All study area roadway segment LOS (Table 16-51) would remain the same as in the No Action Alternative. Traffic conditions associated with operation at the Unocal site in 2010 are presented in Figure 16-7.

The project would have minimal or no impacts on ferry, freight, transit, bicycle, and pedestrian traffic during operation.

2040 Operations

Based on Puget Sound Regional Council (PSRC) forecasts, traffic in the Puget Sound region will continue to grow at an average annual rate of 1 percent into 2040. By 2040, the increased capacity of the treatment plant would require higher staffing. Treatment plant-related traffic would be an estimated 206 daily one-way vehicle trips, including 8

biosolids/grit and 6 chemical truck trips. Eighty-two of the daily trips are estimated to occur during the p.m. peak hour. The analysis indicates that roadway segment capacity is adequate to accommodate treatment plant-associated traffic without changes in LOS as compared to the No Action Alternative. Under 2040 conditions (shown in Figure 16-8), however, background levels of service will reach unacceptable levels (LOS F) for many of the segments along access routes, as shown in Tables 16-53 and 16-54.

Table 16-53. Unocal Site -- Estimated 2040 P.M. Peak-Hour Roadway Segment Levels of Service During Operation

Roadway Segment	No Action	54 mgd	72 mgd Sub-Alternative	54 mgd Combined with Edmonds Crossing, Including Structural Lid
SR-104, north of Pine Street	B	B	B	B
SR-104, north of 100th Avenue W	E	E	E	E
SR-104, north of SR-99	B	B	B	B
SR-104, west of Interstate 5	F	F	F	F
SR-104, south of 15th Avenue NE	C	C	C	C
SR-99, south of SR-104	F	F	F	F
SR-99, north of SR-104	F	F	F	F
SR-522, east of SR-104	F	F	F	F
SR-522, west of SR-527	C	C	C	C
NE 195th Street east of I-405	E	E	E	E

Table 16-54. Unocal Site—Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation

Intersection	No Action		54 mgd		72 mgd Sub-Alternative		54 mgd Combined with Edmonds Crossing, Including Structural Lid	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
SR-104 at Dayton St	D	53	D	54	D	54	F	98
SR-104 at Pine Street (Signalized for Edmonds Crossing Alternative Only)	D	29	D	28	D	28	C	34
SR-104 at 100th Ave W	F	143	F	149	F	150	F	325
SR-99 at 244th St SW	F	127	F	127	F	127	F	137
SR-104 at I-5 Southbound Off-ramp	F	118	F	120	F	120	F	161
SR-104 at 15th Ave NE	F	168	F	168	F	174	F	176
SR-104 at SR-522	F	401	F	401	F	401	F	401
SR-522 at SR-527	F	335	F	335	F	335	F	335

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Unocal 72-mgd Sub-Alternative

If the plant were expanded to 72 mgd to accommodate Lynnwood and Edmonds flows, this expansion would be built near the end of the planning period. Environmental review would be done separately if the cities chose to be serviced by the facility; hence, this sub-alternative was evaluated only for 2040 operational conditions. Traffic conditions associated with 72-mgd operation at the Unocal site in 2040 are presented in Figure 16-9.

The Brightwater plant and outfall would need to be constructed to treat and discharge the full potential flows (72 mgd). Additional pipelines to convey the flows from Edmonds and Lynnwood to the Brightwater plant would also be required. The construction impacts of these new facilities would be evaluated near the time for implementation.

Unocal (54 mgd) Structural Lid Sub-Alternative with Edmonds Crossing

The evaluation of combined impacts considered the combined effects of the Brightwater Treatment Plant and the Edmonds Crossing multimodal transportation facility. The Edmonds Crossing project would include a ferry access roadway system, holding lanes, ferry passenger parking, tollbooths, and areas for bus and commuter rail transit access that are under consideration for this site by the City of Edmonds, Sound Transit, and WSF. Traffic conditions associated with structural lid operation at the Unocal site in 2040 are presented in Figure 16-10. Tables 16-53 and 16-54 summarize combined impacts with operation of both the Brightwater and Edmonds Crossing facilities.

Major impacts to intersection p.m. peak-hour LOS could occur with the combined impacts of treatment plant and multimodal facility traffic. Several intersections could experience significant increases in delay and degradation of LOS. Impacts include a drop in LOS at the intersection of SR-104 and Dayton Street from LOS D in the no-action condition to LOS F with the impacts of both the treatment plant and multimodal facility traffic. Estimated traffic conditions are summarized in Table 16-53 for segment LOS and Table 16-54 for intersection traffic operation LOS during the 2040 p.m. peak-hour traffic conditions.

Proposed Mitigation: Unocal Treatment Plant

Mitigation for the Unocal Treatment Plant site would include measures identified above as common to all systems, plus the measures below. If needed for mitigating transportation impacts, King County will evaluate the potential for use of the existing Unocal dock as a means of reducing construction-related truck trips, including appropriate environmental review.

Construction Mitigation: Unocal Treatment Plant

Additional specific site mitigation measures would be incorporated into a comprehensive traffic management plan (TMP) that would include the following actions:

- Provide an adequate truck queuing storage facility along SR-104 and onsite to accommodate daily construction staging. The northbound left-turn lane of SR-104 at Pine Street would need to be lengthened to provide additional left-turn storage from SR-104 to Pine Street and/or maximize the use of shoulder area for truck queue space. All construction traffic entering and leaving the Unocal site would be synchronized with ferry operations to avoid conflicts and operation delays.
- As part of the TMP, provide parking offsite for construction workers, who would be bused to the construction site. After the treatment plant is constructed, provide adequate onsite parking for employees and visitors. (The Edmonds Crossing structural lid, if constructed, may require two offsite parking lots).
- Maintain access between Edmonds and Woodway for emergency vehicles at all times during the construction and realignment of the Pine Street roadway segment just west of SR-104.

Analysis of the affected roadway segments during the peak construction period showed that the construction traffic would create minimal effect on roadway LOS ratings. However, several study intersections would experience higher delays in comparison to the no-action scenario. Temporary mitigation measures are proposed for key impacted intersections along the Unocal site conveyance corridor during construction and are summarized in Table 16-55. The proposed temporary mitigation measures in conjunction with the TMP mitigation are projected to improve intersection operations to at least the no-action levels. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

Table 16-55. Unocal Site and Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-104 at 15th Avenue NE	X	–	X
SR-522 at SR-527	X	–	X
SR-522 at 68th Avenue NE	X	–	X
SR-104 at 100th Avenue W	X	–	–
SR-104 at Pine Street (Unsignalized)	–	X	X
SR-104 at 232nd Street SW (Flashing Red)	–	X	X

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

Operation Mitigation: Unocal Treatment Plant

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals and for biosolids transport would be designated during the permitting phase.

Specific mitigation measures at the study intersections were investigated for the operational phase of the project. The measures are recommended for two categories, proposed and potential measures. Proposed mitigation addresses the operational deficiencies created by the addition of vehicles generated by the Brightwater project. These deficiencies should be mitigated by King County in conjunction with this project. Potential mitigation addresses background infrastructure deficiencies, not caused by the Brightwater project traffic. These deficiencies are noted, however, but would not be required to be addressed by the County in conjunction with the Brightwater project.

The study intersection operations would be maintained at the no-action LOS levels, or improved levels, during 2010 operations. Potential mitigation is provided at several of the study intersections.

The majority of the intersections during 2040 operations are projected to be at unacceptable levels, as defined by the responsible jurisdiction, without addition of any project trips. All mitigation provided would be potential measures to address general traffic increases in the study area, with the exception of the SR-104/Dayton Street and SR-104/100th Avenue West intersections in the Edmonds Crossing structural lid sub-alternative. These intersections would have a significant increase in delay as a result of the combined treatment plant and Edmonds Crossing traffic. Tables 16-56 and 16-57 identify potential mitigation actions for the Unocal treatment plant site during 2010 operations and for 2040 operations at either 54 mgd or 72 mgd (the measures are the same), respectively. Table 16-58 identifies both proposed and potential mitigation actions for 2040 with Edmonds Crossing.

**Table 16-56. Unocal Site – Intersection Mitigation Measures – 2010 P.M.
Peak-Hour Traffic During 36-mgd Operation**

Intersection	Mitigation Measures	
	Proposed	Potential
SR-104 at 100th Avenue West	None	Provide exclusive EB and WB right-turn lanes on Edmonds Way; Optimize signal timing.
SR-104 at SR-522	None	Provide additional EB left-turn and through lanes (add receiving lane); Provide additional SB left-turn lane; Provide additional WB through lane; Optimize cycle length and signal timing.
SR-522 at SR-527	None	Provide exclusive WB/NB right-turn lane on SR-522.

**Table 16-57. Unocal Site – Intersection Mitigation Measures – 2040 P.M.
Peak-Hour Traffic During 54-mgd or 72-mgd Operation**

Intersection	Mitigation Measures	
	Proposed	Potential
SR-104 at 100th Avenue West	None	Provide exclusive EB and WB right-turn lanes on Edmonds Way; Provide additional NB through lane; Optimize signal timing.
SR-99 at 244th Street SW	None	Provide additional SB left-turn lane; Provide additional EB left-turn lane; Modify phasing and signal timing on 244th Street SW to protect the left-turn movements.
SR-104 at I-5 Southbound Off-ramp	None	Optimize signal timing; Add westbound through lane.
SR-104 at 15th Avenue NE	None	Provide additional EB through lane; Provide two exclusive NB left-turn lanes.
SR-104 at SR-522	None	Provide additional EB and WB through lanes and SB left-turn lanes.
SR-522 at SR-527	None	Provide additional through and turn lanes on Bothell Way NE.

**Table 16-58. Unocal Site – Intersection Mitigation Measures – 2040 P.M.
Peak-Hour Traffic During 54-mgd with Structural Lid Operation**

Intersection	Mitigation Measures	
	Proposed	Potential
SR-104 at Dayton Street	None	Provide additional WB left-turn lane; Optimize phasing and signal timing.
SR-104 at 100th Avenue West	Provide exclusive right-turn lanes on all approaches; Provide additional NB through lane; Provide additional NB left-turn lane; Optimize phasing and signal timing.	None
SR-99 at 244th Street SW	None	Provide additional SB left-turn lane; Provide additional EB left-turn lane; Modify phasing and signal timing on 244th Street SW to protect the left-turn movements.
SR-104 at I-5 Southbound Off-ramp	None	Optimize signal timing; Add westbound through lane.
244th Street SW at Ballinger Way NE and 15th Avenue NE	None	Provide additional EB through lane; Provide two exclusive NB left-turn lanes.
SR-104 at SR-522	None	Provide additional EB and WB through lanes and SB left-turn lanes.
SR-522 at SR-527	None	Provide additional through and turn lanes on SR-522.

16.3.3.2 Conveyance: Unocal System

Construction Impacts: Unocal Corridor

Construction of the Unocal conveyance system would generally have the same types of impacts that are described above for the Route 9 conveyance corridors.

Primary Portals

A straight-line growth factor of 1 percent per year was applied to the study intersections' existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the regional model forecasts and historical traffic growth.

For all primary portals, construction of each portal is expected to peak in 2007. The construction trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative Brightwater construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total construction traffic volumes.

The results of the intersection analysis for the primary portals are shown in Table 16-59. Estimated peak construction trips for the primary portals are included in Appendix 16-B, Transportation Impacts: Plant Sites and Conveyance.

Table 16-59. Unocal Corridor, Primary Portals – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Portal 14	No Action		Site A		Site B		Site D	
I-405 NB Ramp at NE 195th St	36	D	38	D	38	D	38	D
I-405 SB Ramp at NE 195th St	24	C	25	C	25	C	25	C
NE 195th Street at North Creek Parkway	51	E	51	E	51	E	51	E
120th Avenue NE at North Creek Parkway	15	C	16	C	16	C	16	C
NE 180th St at 132nd Ave NE	116	F	116	F	116	F	116	F
132nd Avenue NE at SR-522 WB Ramps	27	C	28	C	28	C	28	C
Portal 11	No Action		Site A		Site B		Site C	
SR-522 at 68th Avenue NE	118	F	112	F	112	F	126	F
SR-522 at SR-527	88	F	89	F	89	F	89	F
68th Avenue NE at NE 175th St	17	B	17	B	17	B	17	B
68th Avenue NE at NE 181st Street, Northern T	9	A	9	A	9	A	9	A
68th Avenue NE at NE 181st Street, Rite-Aid Driveway	13	B	13	B	13	B	13	B

Table 16-59. Unocal Corridor, Primary Portals – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction (cont.)

Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Portal 7	No Action		Site A		Site B		Site C	
SR-104 at 25th Avenue NE	31	C	40	D	40	D	40	D
SR-104 at 15th Avenue NE	66	E	75	E	86	E	86	E
SR-104 at I-5 Southbound Ramps	32	C	44	D	44	D	44	D
Portal 3	No Action		Site D		Site E		Site F	
SR-104 at I-5 Southbound Ramps	32	C	44	D	44	D	44	D
SR-104 at 232nd Street SW ^b	37	E	50	F	50	F	50	F

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

^b Delay value represents the highest delay on the stop-controlled legs of the intersection (232nd SW)

Portal 11

Construction impacts including the pump station are similar to those discussed above for Portal 11 in the Route 9 – 195th Conveyance section. The results of the intersection analysis are shown in Table 16-37 (for Portal 11).

Portal 14

The additional construction traffic is projected to have a minimal effect on the study intersections. LOS is projected to remain the same as the no-action scenario. With the signalization project at the intersection of NE 180th Street and 132nd Avenue NE, the intersection would operate at LOS C.

All roadways identified within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

A police station is located just northwest of the portal siting area. There are also two parks in the area, called North Creek Sportsfields. One park is north of the portal sites, between North Creek Parkway and 120th Avenue NE, and the other straddles North Creek Parkway and is within two of the proposed siting locations, sites A and B. Vehicular and non-motorized access to the sports fields and/or police station may be affected.

Portal 7

The additional construction traffic would increase delays at the study intersections slightly. The intersections of Ballinger Way NE/25th Avenue NE and SR-104/I-5 Southbound Ramps would operate at LOS D levels, which is still within acceptable operating conditions as defined by WSDOT. The Ballinger Way/15th Avenue NE intersection would remain at LOS E conditions.

Portions of Ballinger Way NE and 25th Avenue NE may experience adverse impacts to pedestrians and non-motorized vehicles where existing separated facilities are not available, and they may be required to share the roadway with construction vehicles.

25th Avenue NE may also experience impacts to pavement from the construction vehicle traffic, and on-street parking may be affected.

Brugger's Bog Park is located within one of the alternative portal sites, site C. A Park-n-Ride lot is located west of the portal siting area on Forest Park Drive NE near NE 195th Place. Vehicular and non-motorized access to the park and/or Park-n-Ride may be affected.

Portal 3

The additional construction traffic is projected to increase average vehicle delays at both study intersections. The LOS for the SR-104/I-5 Southbound Ramps would decline to LOS D for all portal alternatives. LOS D remains within acceptable operating conditions as defined by the responsible jurisdiction, WSDOT. Edmonds Way/232nd Street SW would decline to LOS F.

SR-104 within the construction route is characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

232nd Street SW and 92nd Avenue W may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles because the roads are not furnished with sidewalks or bicycle lanes in the affected segments.

A fire station is located northeast of the portal siting area, near 231st Street SW and 88th Avenue West. Vehicular and non-motorized access to the station may be affected.

Secondary Portals

Background traffic volumes were derived using the same methodology as for the primary portals. Results of the intersection analysis for each of the secondary portals are shown in Tables 16-60 through 16-63. Generally, the secondary portal construction impacts would be minimal. The LOS would be similar to the no-action scenario. With the cumulative construction traffic the intersection of SR-104 with I-5 SB ramps is expected to change from LOS C to D, which is still within the acceptable standards.

Construction of each secondary portal, if required, is expected to peak in 2007. Each portal would generate an average of three truck trips per day and would not affect -hour traffic.

The trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative Brightwater construction-related traffic from surrounding portals and/or treatment plant facilities were included in the total construction traffic volumes.

Table 16-60. Unocal Corridor, Portal 13 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site A		Site B		Site C	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-522 at SR-527	88	F	89	F	89	F	89	F

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 16-61. Unocal Corridor, Portal 12 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site C		Site E	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-522 at SR-527	88	F	89	F	89	F
80th Avenue NE at SR-522	59	E	61	E	61	E

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 16-62. Unocal Corridor, Portal 10 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site A		Site C		Site D		Site E	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-522 at SR-527	88	F	89	F	89	F	89	F	89	F
SR-522 at 80th Avenue NE	59	E	61	E	61	E	61	E	61	E
SR-522 at 68th Avenue NE	118	F	121	F	121	F	121	F	121	F

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 16-63. Unocal Corridor, Portal 5 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Intersection	No Action		Site X		Site B	
	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104 at 15th Avenue NE	66	E	75	E	75	E
SR-104 at I-5 Southbound Ramps	32	C	44	D	44	D

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

Connections to Existing Sewers

Additional construction activity to connect existing sewer lines to the Unocal conveyance tunnel would occur in the vicinity of Portals 14 and 11. These pipeline connections would be accomplished with short open cut or microtunneling construction methods on land area adjacent to and off of the existing roadway system. Occasionally, truck access would be accomplished with flaggers. When construction occurs at roadways, traffic control would be coordinated with local jurisdictions and emergency service providers. At Portal 14, the connection route would follow North Creek Parkway to the south (depending on the final portal site). The connection would be made by microtunneling, whereby no effects on roadways would occur except at microtunnel pit locations.

Operation Impacts: Unocal Corridor***Primary Portals***

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Additional facilities including hydraulic control structures, pump stations, odor control, or chemical injection facilities are included with Portals 11, 14 and 7. The additional facilities would generate approximately two trips per week for maintenance and inspections.

Secondary Portals

Since the completed conveyance system would be below ground for all secondary portals, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Proposed Mitigation: Unocal Corridor

The proposed mitigation is consistent with the measures described above under Mitigation in the section entitled Proposed Mitigation Common to All Systems.

Construction Mitigation: Unocal Corridor***Primary Portals***

The study intersections surrounding the potential portal site, and its construction route showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All study intersections would operate at the same LOS as the no-action conditions with the exception of three intersections. With additional trips created by the construction of the portals, the intersection of SR-104/I-5 Southbound ramps would change from LOS C to LOS D, which remains within the acceptable

operating threshold for WSDOT. The SR-104/25th Avenue NE intersection associated with Portal 7 also changes from a LOS C to D. The stop-controlled 232nd Street SW approach to SR-104, associated with Portal 3, would change from an LOS E to F.

Temporary mitigation measures are proposed for key impacted intersections along the Unocal conveyance corridor during construction and are summarized in Table 16-64. The proposed temporary mitigation measures in conjunction with the TMP mitigation are projected to improve intersection operations to at least the no-action levels. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

Table 16-64. Unocal Site and Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Intersection	Proposed Mitigation Measures		
	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary restriping of impacted approach lanes
SR-104 at 15th Avenue NE	X	–	X
SR-522 at SR-527	X	–	X
SR-522 at 68th Avenue NE	X	–	X
SR-104 at 100th Avenue W	X	–	–
SR-104 at Pine Street (unsignalized)	–	X	X
SR-104 at 232nd Street SW (flashing red for 232nd Street SW)	–	X	X
NE 195th Street at North Creek Parkway	X	–	–
NE 180th Street at 132nd Avenue NE	X	–	–
80th Avenue NE at SR-522	X	–	–

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

Specific locations for mitigation along the construction routes were also identified based on the existing roadway conditions and geometry. Table 16-65 identifies those locations along the construction routes for the conveyance corridor. All construction routes would be subject to the full TMP and mitigation measures; however, based on existing conditions, the following locations should be monitored.

Secondary Portals

The study intersections surrounding each potential secondary portal site, and its construction route showed that the additional trips during the peak construction period would result in small average increases in vehicle delay. All secondary portal sites would

operate at the same LOS as the "no-action" conditions. No additional mitigation is recommended for these portals.

**Table 16-65. Unocal Site and Corridor –
Construction Route Mitigation Measures**

Construction Route ^a	Proposed Mitigation Measures		
	Pavement Conditions	Non-motorized Facilities	On-street Parking
NE 195th Street	–	–	–
North Creek Parkway	–	–	–
NE 120th Avenue	–	–	–
132nd Avenue NE	–	–	–
NE 180th Street	–	–	–
SR-522	–	–	–
68th Avenue NE	–	–	–
NE 175th Street	X	X	X
SR-104	–	X	–
25th Avenue NE	X	X	X
232nd Street SW	X	X	–
92nd Avenue W	X	X	–

X This denotes mitigation measure is proposed.

– This denotes mitigation measure is not proposed.

^a Roadway sections vary within the corridor; thus, the issue may not apply to the entire roadway

Operation Mitigation: Unocal Corridor

Trucks accessing the construction site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals would be designated during the permitting phase. These routes would be determined upon selection of preferred sites for the portals.

Primary Portals

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during operation and maintenance of any permanent pump station, dechlorination, tunnel access, odor control, and/or ventilation facilities. Therefore, mitigation for operation of the conveyance system is not proposed.

Secondary Portals

Transportation impacts of the conveyance system are related almost exclusively to construction activities. The conveyance system would generate minimal traffic during

operation and maintenance of any permanent tunnel access. Therefore, mitigation for operation of the conveyance system is not proposed.

16.3.3.3 Outfall—Unocal

Construction Impacts: Unocal Outfall

Construction activity at Zone 6 would take place near the Edmonds Marina, tribal fishing areas, the Unocal dock, and Edmonds Terminal. An underwater sea park is located approximately 1.25 miles north of Zone 6. Barges for potential marine disposal of material excavated during outfall construction are not expected to have significant impact on access to any of these areas or marine traffic in or near Zone 6.

The assumptions for estimated truck and barge trips in Zone 6 are the same as for Zone 7S. For onshore construction, the total number of truck trips is estimated at 590 for removal of excavated material, and 570 for backfill and pipeline segment delivery. For nearshore construction, the number of barge trips is estimated at 17 for removal of excavated material, and 18 for backfill and pipeline segment delivery.

The anticipated duration of onshore trench construction is 1 to 2 months; thus, 13 to 27 truck trips per day would be required for removal of onshore excavated soils. Pipe segments and backfill materials are likely to be delivered to the plant site staging area over a period of 2 to 3 months prior and/or during construction. Eight to 12 truck trips per day would be required for delivery of materials over that time period.

Assumptions for the nearshore trench construction are the same as for Zone 7S.

Peak construction of the Zone 6 outfall was assumed to occur concurrently with the Unocal site peak construction period. Therefore, transportation impacts were incorporated with the Unocal site analyses.

Operation Impacts: Unocal Outfall

Normal operation of the marine outfall would not impact marine transportation within Zones 6 or 7S. The outfall pipeline will be buried below the seabed to a water depth of approximately -80 feet MLLW. Below this depth the pipeline will be laid directly on the seabed. There would be no above-water or near-surface structures that could impact vessel traffic, nor would there be any restrictions on anchoring as a result of the outfall.

Land transportation would not be impacted by operation and maintenance of the outfall. Regular maintenance requirements for the outfall pipelines include cathodic protection monitoring of steel pipelines and periodic inspection. Inspection and maintenance of the

cathodic protection system would be performed periodically by King County staff and would not require equipment that would impact marine transportation.

It is anticipated that visual inspection of the pipeline would be performed by divers and/or a remotely operated vehicle (ROV) approximately every 5 years and after any significant seismic event. Inspection activities would occur below the water surface and would be supported by one or more surface vessels. Inspection vessels would not interfere with commercial or recreational maritime traffic.

Proposed Mitigation: Unocal Outfall

Construction: Mitigation: Outfall

Construction vessel traffic would be coordinated with WSDOT to minimize impacts to scheduled ferry service. Construction activities would also be coordinated with marina and tribal government officials to reduce interference with fishing and recreational boating activities. Truck traffic mitigation measures would be followed as described for Unocal plant construction.

Operation: Mitigation: Outfall

Vessels involved in the periodic inspection of the outfall pipeline would be marked and lighted in accordance with applicable U.S. Coast Guard regulations so that operators of other vessels would be alerted to their presence and operating status. Outfall operation would not have impacts on land transportation systems.

16.3.4 Impacts: No Action Alternative

The No-Action alternative represents a future “baseline” condition without the project, reflecting overall predicted traffic growth in the area. It also includes assumptions about roadway improvements that would take place with or without the proposed project, and that affect the results of traffic modeling performed for this analysis. The planned roadway improvements are described above under Planned Improvements. Discussion of the No Action Alternative provides a better understanding of the differences in traffic that are attributable to the project, compared with those that are simply the result of area-wide traffic growth. The baseline conditions resulting from the Costco site construction and operation are addressed in 16.3.5 Cumulative Impacts.

The No Action analysis included several evaluations. Year 2010 was evaluated as the assumed baseline for opening-year operational impacts (traffic volumes are illustrated in Figure 16-11). Year 2040 (Figure 16-12) was chosen to represent operational impacts at full build-out of the wastewater treatment plant. Anticipated traffic volumes, levels-of-service, and predicted delay for all affected routes in the study area are shown in Tables 16-66 and 16-67 for both 2010 and 2040. Analyses were also performed for Year

2007 during the peak construction period of the plant and portal sites (traffic volumes are illustrated in Figure 16-13).

Table 16-66 presents predicted future conditions along the study roadways under the No Action Alternative. In 2007 and 2010, levels-of-service for all roadway segments are expected to be similar to existing conditions. With increased traffic volumes caused by general population growth, the study intersections are expected to remain at their existing acceptable levels as defined by the responsible jurisdiction or continue at LOS F, with the exception of one WSDOT roadway segment. That segment is SR-104 west of I-5, which is projected to decrease from an existing LOS E to LOS F by 2010. By 2040, three additional segments under WSDOT jurisdiction—SR-104 west of 100th Avenue West and SR-99 north and south of SR-104—are predicted to drop to LOS E/F conditions as a result of regional traffic growth.

**Table 16-66. Study Segment P.M. Peak-Hour Levels of Service—
No Action Alternative**

Location	P.M. Peak LOS		
	2007 No Action	2010 No Action	2040 No Action
Route 9 Site and 195th Street Corridor (including influent corridor)			
SR-104, west of Interstate 5	E	F	F
SR-104, south of 15th Avenue NE	C	C	C
SR-99, south of SR-104	D	D	F
SR-99, north of SR-104	C	C	F
SR-522, east of SR-104	F	F	F
SR-522, west of SR-527	C	C	C
NE 195th Street, east of Interstate 405	E	E	E
228th Street SE, west of SR-9	C	C	C
228th Street SE, east of SR-527	B	B	C
SR-9, north of SR-522 ^a	F	F	F
Route 9 Site and 228th Street Corridor (including influent corridor)			
SR-104, west of Interstate 5	E	F	F
SR-104, south of 15th Avenue NE	C	C	C
SR-99, south of SR-104	D	D	F
SR-99, north of SR-104	C	C	F
SR-522, east of SR-104	F	F	F
SR-522, west of SR-527	C	C	C
NE 195th Street, east of Interstate 405	E	E	E
228th Street SE, west of SR-9	C	C	C
228th Street SE, east of SR-527	B	B	C
SR-9, north of SR-522 ^a	F	F	F

**Table 16-66. Study Segment P.M. Peak-Hour Levels of Service—
No Action Alternative (cont.)**

Location	P.M. Peak LOS		
	2007 No Action	2010 No Action	2040 No Action
Unocal Site and Corridor			
SR-104, north of Pine Street	B	B	B
SR-104, west of 100th Avenue W	C	C	E
SR-104, north of SR-99	B	B	B
SR-104, west of Interstate 5	E	F	F
SR-104, south of 15th Avenue NE	C	C	C
SR-99, south of SR-104	D	D	F
SR-99, north of SR-104	C	C	F
SR-522, east of SR-104	F	F	F
SR-522, west of SR-527	C	C	C
NE 195th Street, east of Interstate 405	E	E	E

^a Does not include WSDOT SR-9 widening project

Table 16-67 presents predicted future conditions at key study intersections under the No Action Alternative. In 2007, four of the No Action study intersections would change from LOS D to LOS E as compared with existing conditions during the p.m. peak hour. All of the intersections that are projected to decline to unacceptable levels by 2007 are under state jurisdiction. By 2040 only two of the study intersections are expected to operate at acceptable conditions: SR-104/Dayton Street and SR-104/Pine Street. Both of these intersections are along a WSDOT route within the City of Edmonds.

**Table 16-67. Study Intersection P.M. Peak-Hour Levels
of Service and Delay—No Action Alternative**

Intersection	2007 No Action		2010 No Action		2040 No Action	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
Route 9 Site and 195th Street Corridor (including influent corridor)						
SR-99 at 244th Street SW	E	58	E	63	F	127
SR-104 at I-5 Southbound Off-ramp	C	32	D	36	F	118
SR-104 at 15th Avenue NE	E	66	E	73	F	168
SR-104 at SR-522	F	212	F	229	F	401
SR-522 at SR-527	F	88	F	105	F	335
SR-9 at 228th Street SE ^b	D	43	D	44	F	82
SR-9 at SR-522 Eastbound Ramps ^b	D	48	D	53	F	114
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	C	21	C	22	F	52
SR-9 at SR-524	E	80	F	88	F	185

Table 16-67. Study Intersection P.M. Peak-Hour Levels of Service and Delay—No Action Alternative (cont.)

Intersection	2007 No Action		2010 No Action		2040 No Action	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
Route 9 Site and 228th Street Corridor (including influent corridor)						
SR-522 at SR-527	F	88	F	105	F	335
SR-9 at 228th Street SE ^b	D	43	D	44	F	82
SR-527 at 228th Street SE	E	58	E	65	F	209
SR-9 at SR-522 Eastbound Ramps ^b	D	48	D	53	F	114
SR-9 at SR-522 Westbound Ramps ^b (Unsignalized)	C	21	C	22	F	52
SR-9 at SR-524	E	80	F	88	F	185
Unocal Site and Corridor						
SR-104 at Dayton Street	B	15	B	16	D	53
SR-104 at Pine Street (Unsignalized)	C	17	C	18	D	29
SR-104 at 100th Avenue W	E	60	E	66	F	143
SR-99 at 244th Street SW	E	58	E	63	F	127
SR-104 at I-5 Southbound Off-ramp	C	32	D	36	F	118
SR-104 at 15th Avenue NE	E	66	F	73	F	168
SR-104 at SR-522	F	212	F	229	F	401
SR-522 at SR-527	F	88	F	105	F	335

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

^b Does not include WSDOT SR-9 widening project

LOS analyses for intersections along SR-9 were also conducted for conditions with WSDOT's planned SR-9 capacity improvements (Table 16-68). The 2007 analyses assume the improvements are under construction. The analyses also conservatively assumed that no traffic diversions occurred due to the lack of convenient parallel routes. Minor peak spreading would likely occur. The 2010 and 2040 analyses assume completion of the SR-9 roadway improvement project.

Delays will increase during the roadway construction activities; however, upon completion of the project, all intersections are projected to operate at acceptable levels as defined by WSDOT thresholds. The study roadway segment of SR-9 north of SR-522 is also expected to operate well, at LOS C levels once the capacity improvements are completed.

Table 16-68. SR-9 Study Intersection P.M. Peak-Hour Levels of Service and Delay—No Action Alternative with SR-9 Roadway Improvements

Intersection	2007 (ongoing construction of SR-9 improvements)		2010 (SR-9 improvements completed)		2040 (SR-9 improvements completed)	
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
SR-9 at 228th Street SE	D	54	C	21	C	28
SR-9 at SR-522 Eastbound Ramps	D	48	C	28	D	37
SR-9 at SR-522 Westbound Ramps (Unsignalized)	C	21	B	16	C	20
SR-9 at SR-524	F	117	C	25	C	28

^a Average delay, measured in seconds per vehicle (s/v), includes deceleration time, stopped time, and acceleration time due to intersection controls.

16.3.5 Cumulative Impacts

Cumulative impacts of the project on its surroundings and the associated mitigation measures are inherent in the methodologies utilized for the traffic impact analyses. The preceding subsections of Section 16.3, Impacts and Mitigation, take cumulative effects into account as follows:

- Background traffic growth of 1 percent per year is consistent with historical and projected growth within the study area. The growth accounts for general population and traffic increases associated with transportation trends and unspecified developments.
- Planned roadway improvements are described above under the Planned Improvements discussion. The analyses accounted for planned changes to the transportation network.
- Planned developments are also described above in the Planned Improvements discussion.
- For each alternative, traffic associated with treatment plant, conveyance system, and outfall trips was overlaid onto the future background traffic volumes prior to performing analyses.

Specific planned projects that could potentially create cumulative transportation impacts were examined. Two projects are likely to occur near the Route 9 site: SR-9 Roadway Improvements and the Costco Warehouse development. At the Unocal site, the Edmonds Crossing multimodal facility could be constructed during the same timeframe on a structural lid over the Unocal treatment plant.

All traffic analyses were performed for the highest, or p.m., peak hour period. The comparisons of cumulative impacts, below, begin with baseline (no build) conditions and add factors (Brightwater construction, concurrent construction, etc.) progressively.

SR-9 Improvement Project

Cumulative impact analyses for the SR-9 roadway improvements were performed for intersections along SR-9. The analyses indicate that two study intersections would be affected with the Route 9 plant construction: SR-9 at 228th Street and SR-9 at SR-522 Eastbound ramps.

The intersection LOS for the 2007 No Action scenario was estimated at LOS D for both intersections. With the treatment plant construction these intersections would decline to LOS F and E, respectively.

With concurrent construction of the Route 9 plant and the SR-9 improvements, the SR-9/228th Street SE intersection would experience greater delays. However, LOS level would be LOS F, the same as if construction were not concurrent. The SR-9/SR-522 Eastbound ramps intersection would be at LOS E whether or not construction is concurrent.

Concurrent construction would also increase delays at the intersection of SR-9 and SR-524, causing a decline from LOS E to LOS F. Non-concurrent construction would not affect this intersection.

LOS analyses were also conducted for operation of the completed treatment plant, assuming completion of the SR-9 improvements. All intersections on SR-9 are projected to operate at acceptable LOS D or better (WSDOT standards) through Year 2040.

Costco Warehouse Development

Cumulative impact analyses for construction of a Costco Warehouse were performed for the intersections along SR-9. The analyses indicate that two study intersections would be affected with the Route 9 plant construction: SR-9 at 228th Street SE and SR-9 at SR-522 Eastbound ramps. These analyses are based upon the assumption of SR-9 without improvements (existing SR-9 routing).

The intersection LOS for the 2007 No Action Alternative was estimated at LOS D for both intersections. With the treatment plant construction these intersections would decline to LOS F and E, respectively.

With concurrent Brightwater and Costco peak construction, the analysis indicates that the combined construction traffic would cause minimal delays over the 2007 Brightwater-only construction traffic. The increase would be only 0 to 2 seconds, and LOS would be the same at LOS F and E, respectively.

Cumulative SR-9 Construction and Costco Warehouse Operation

Cumulative impact analyses assuming concurrent construction of the Brightwater and SR-9 projects, concurrent with Costco Warehouse operations, were performed for intersections along SR-9. This combination would have the greatest impact of all planned projects and developments in the study area.

The assumed 2007 base condition was concurrent Brightwater and SR-9 construction (see above) without considering Costco. In this condition, the intersection of SR-9 and SR-522 Westbound ramps would experience LOS C for the 195th Street corridor alternative or LOS D for the 228th Street corridor alternative.

The additional traffic associated with the Costco Warehouse operation is expected to increase delays at several study intersections. The SR-9/SR-522 Westbound ramps intersection would experience small delay increases, changing its LOS from LOS C (195th Street corridor)/D (228th Street corridor) to LOS E for both corridors. Only small increases in delay would occur at SR-9/228th Street SE and SR-9/SR-524.

Unocal Structural Lid Sub-Alternative

Cumulative construction impact analyses were performed for the Unocal treatment plant and the structural lid for the proposed Edmonds Crossing facility. The analyses indicate that two study intersections along SR-104 would be affected: SR-104 at 100th Avenue W and SR-104 at I-5 Southbound off-ramp.

The intersection LOS for the 2007 No Action Alternative was estimated at LOS E for SR-104/100th Avenue W and LOS C for SR-104/I-5 Southbound off-ramp. With the treatment plant construction these intersections would decline to LOS F and D, respectively.

With construction of the lid, the total estimated daily construction trips to the Unocal site in the peak construction period (Year 2007) are slightly lower than without the lid. Cumulative intersection and roadway operations would be similar with or without lid construction.

Concurrent construction of the lid would, however, increase the required work force. The increase in construction workers would require that at least two candidate parcels be used together for remote worker parking. As a result, the intersection and roadway impacts would be greater surrounding the candidate parcel sites for the parking facilities. Intersection LOS would likely decline in the direct vicinity of the remote parking facilities.

Unocal Structural Lid Sub-Alternative and Edmonds Crossing

Cumulative impact analyses were performed considering construction of the Unocal treatment plant, structural lid, and Edmonds Crossing. The analyses indicate that, as stated above under “Unocal Structural Lid Sub-Alternative,” two study intersections along SR-104 would be affected: SR-104 at 100th Avenue W and SR-104 at I-5 Southbound off-ramp.

The intersection LOS for the 2007 No Action Alternative was estimated at LOS E for SR-104/100th Avenue West and LOS C for SR-104/I-5 Southbound off-ramp. With the treatment plant and structural lid construction these intersections would decline to LOS F and D, respectively.

For this scenario, delays are projected to increase slightly at the study intersections. However, LOS levels are projected to remain the same as for construction of the treatment plant and lid only. Segment LOS would also remain the same.

Cumulative impacts during 2040 operations of both facilities would change LOS from D to F at the SR-104/Dayton Street intersection. The SR-104/Pine Street intersection would be signalized in the cumulative scenario and would operate acceptably at LOS C. The SR-104/100th Avenue West intersection would operate at LOS F under both cumulative and non-cumulative conditions; however, delays would increase significantly with the Edmonds Crossing traffic. All other Unocal study intersections would remain at LOS F.

Mitigation Cumulative Impacts

Mitigation measures to address the cumulative impacts are consistent with the Brightwater mitigation plan. During construction, temporary adjustments to traffic signals and lane approaches, as well as traffic control flaggers, would be utilized to improve conditions to the No-Action or better. King County would coordinate construction activities among the concurrent projects to minimize impacts and disruption of traffic flow.

Mitigation measures to address cumulative impacts during 2040 operations consist mainly of potential measures to address background infrastructure deficiencies. These deficiencies would not be required to be addressed by King County. One exception is the SR-104/Dayton Street intersection, where additional turn lanes and optimized signal timing are proposed.

16.4 Significant Unavoidable Adverse Impacts

16.4.1 Route 9 System

16.4.1.1 Treatment Plant: Route 9

Construction Impacts: Route 9 Treatment Plant

During peak construction activities approximately 107 net new p.m. peak-hour trips would be added to the surrounding transportation network. If construction does not occur concurrently with SR-9 improvements, these additional trips would create minimal delays in traffic movement and circulation in the vicinity of the treatment plant site during the peak traffic hours and, while unavoidable, would not be considered significant. The exception is the intersection of SR-9 at 228th Street SE. This intersection would experience a significantly longer average vehicle delay during construction. The LOS would change from D to F.

The net daily trips may actually be less than zero due to current land uses that would be displaced. These land uses generate an estimated 700-900 daily trips, whereas the project would generate approximately 852 daily trips during peak construction activities. Pedestrians may be rerouted from sidewalks and shoulders around the project site. A higher number of accidents could potentially occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

With concurrent construction of SR-9 road improvements, the SR-9/228th Street SE intersection is projected to have significantly longer average delay and would be a significant adverse impact (Table 16-27) resulting from the different projects and projected background growth. These adverse impacts would be caused primarily by the capacity reductions due to concurrent construction of SR-9 road improvements. The SR-9/SR-522 Eastbound ramps intersection is also projected to operate at LOS E. The SR-9 roadway segment north of SR-522 is projected to remain at LOS F. All of the SR-9 intersections are under state jurisdiction.

Operation Impacts: Route 9 Treatment Plant

Long-term impacts would be related to the generation of automobile and truck trips by the treatment plant at full build-out and trips related to the proposed community-oriented building, specific only to the Route 9 site. The treatment plant would generate approximately 235 vehicle trips per day in 2010 (301 in 2040). This would include 10 truck trips by maintenance and supply trucks during Year 2010 operations (14 in Year 2040) and 95 trips related to the community-oriented building. This would be a net benefit because the plant operations traffic would only be one-third the number of vehicles generated under the current land uses of the Route 9 site (700-900 daily trips).

16.4.1.2 Conveyance–Route 9–195th Street Corridor

Construction Impacts: Route 9–195th Street Corridor

Primary Portals

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

During construction of the conveyance system, construction truck and worker vehicle access to portals would be present within various neighborhoods. A number of citizens have commented that these impacts would be considered significant. An increase in conflicts with residential environments and non-motorized access to commercial or public facilities could occur as described below. Potential for sharing of right-of-way between pedestrians, other non-motorized modes and construction traffic may occur. The final portal site selected would determine the extent of the actual impacts.

- Portal 5, in the Mountlake Terrace/Shoreline area, is located within a commercial area in which access to shopping activities could be affected.
- Portal 11, in the Kenmore area, is also located within a commercial area. Pedestrian access to shopping, City Hall, and a Park-n-Ride facility could be affected.
- Portal 19, in the Shoreline/Woodway/unincorporated Snohomish County area would be located within a public utilities area. Access to these facilities could be affected.
- Portal 41, in the Bothell area, is generally within an industrial area; however, access to the sports fields could be affected.
- Portal 44, in the Kenmore area, is located within a residential neighborhood. Neighborhood activities and access to Westhill Park could be affected.

16.4.1.3 Conveyance—Route 9—228th Street Corridor

Construction Impacts: Route 9—228th Street Corridor

Primary Portals

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

During construction of the conveyance system, construction truck and worker vehicle access to portals would be present within various neighborhoods. An increase in conflicts with residential environments and non-motorized access to commercial or public facilities could occur as described below. Potential for sharing of right-of-way between pedestrians, other non-motorized modes and construction traffic may occur. The final portal site selected would determine the extent of the actual impacts.

- Portal 39, in the Bothell area, is located within a residential neighborhood. Neighborhood activities could be affected.
- Portal 33, in unincorporated Snohomish County, is located within a mixed residential and commercial area. Neighborhood activities and access to the commercial area could be affected.
- Portal 26, in the Mountlake Terrace/Edmonds area, is located within a mixed residential and commercial area. Neighborhood activities and access to the commercial area and Ballinger Park could be affected.

16.4.1.4 Outfall—Route 9

No significant unavoidable adverse impacts on marine traffic would result from construction or operation of the Brightwater outfall at Zone 7S.

16.4.2 Unocal System

16.4.2.1 Treatment Plant: Unocal

Construction Impacts: Unocal Treatment Plant

During peak construction activities approximately 690 daily trips (117 peak-hour trips) would be added to the surrounding transportation network. These additional trips would

create minimal delays in traffic movement and circulation in the vicinity of the treatment plant site during the peak traffic hours. During the first few years of Unocal site construction, traffic leaving Edmonds Ferry Terminal would experience delays between Pine Street and 100th Avenue West as a result of spoils hauling trucks climbing the SR-104 grades. Access to the Town of Woodway would experience slight delays when construction occurs to accomplish connections to the relocated portion of Pine Street. Pedestrians may be rerouted from sidewalks/shoulders around the project site. A higher number of accidents could potentially occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

During the peak construction period, with the construction of a structural lid over the Unocal plant site to accommodate the Edmonds Crossing project, the estimated trips at the site would be slightly lower than without the lid. Approximately 604 daily (110 p.m. peak-hour) trips were estimated during peak construction activities. However, worker trips to offsite parking areas would create additional delays in the vicinity of the selected parking areas. The potential offsite parking areas are in the vicinity of the Interstate 5/SR-104 Interchange and 236th Street SW near SR-99.

Operational Impacts: Unocal Treatment Plant

Long-term impacts would be related to the generation of automobile and truck trips by the treatment plant at full build-out. The treatment plant would generate approximately 140 trips per day in 2010 (206 in 2040 at 54 mgd, 262 in 2040 at 72 mgd). This would include 10 truck trips by maintenance and supply trucks in 2010 (14 in 2040 at 54 mgd, 18 in 2040 at 72 mgd). Unavoidable delays of traffic would be minimized through the designation of specific access routes upon selection of a preferred site for the treatment plant.

16.4.2.2 Conveyance: Unocal Corridor

Construction Impacts: Unocal Corridor

Primary Portals

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

During construction of the conveyance system, construction truck and worker vehicle access to portals would be present within various neighborhoods. A number of citizens have commented that these impacts would be considered significant. An increase in conflicts with residential environments and non-motorized access to commercial or public facilities could occur as described below. Potential for sharing of right-of-way between pedestrians, other non-motorized modes and construction traffic may occur. The final portal site selected would determine the extent of the actual impacts.

- Portal 14, in the Bothell area, is located within a mixed industrial and public use area. Access to the Police Station and parks could be affected.
- Portal 11, in the Kenmore area, is also located within a commercial area. Pedestrian access to shopping, City Hall, and a Park-n-Ride facility could be affected.
- Portal 7, in the Shoreline/Lake Forest Park area, is located within a mixed industrial and public use area. Access to the Park-n-Ride and Brugger's Bog Park could be affected.
- Portal 3, in Edmonds, is located within a mixed residential and commercial area. Neighborhood activities and access to the Fire Station and commercial areas could be affected.

16.4.2.3 Outfall—Unocal

No significant unavoidable adverse impacts on marine traffic would result from construction or operation of the Brightwater outfall at Zone 6.

16.5 Summary of Impacts and Mitigation

Table 16-69 summarizes potential transportation impacts and mitigation measures for the Brightwater system alternatives, as well as construction and operational impacts.

Table 16-69. Summary of Potential Transportation Impacts and Proposed Mitigation for Brightwater Systems

Brightwater System	System Component	Impacts	Mitigation
Common to All Systems	Treatment Plant	<u>Construction</u> <ul style="list-style-type: none"> Heavy construction, such as major earthwork excavation and concrete placement, would create the greatest traffic impacts along construction access routes. Expected to last 2-3 years. 	<u>Construction</u> <ul style="list-style-type: none"> Develop comprehensive traffic management plan (TMP) including these actions: Coordinate with local agencies for final plan approval; Notify police, fire, ambulance, and transit agencies of lane encroachments (Street closures or blockages would not be expected in all construction phases); Provide flagger or traffic control to maintain safe access; Monitor progress of other construction along routes and avoid conflicts; Maintain traffic flow and access to properties affected by construction; Provide parking plan; Monitor roadway conditions during construction, provide mitigation, and restore to preconstruction condition as determined in concert with the local jurisdiction; Provide safe access for bicyclists and pedestrians; Provide multiple sources of construction activity updates; Coordinate utility construction to minimize traffic disruption; Coordinate all planned construction projects with the jurisdiction. Construction and operation impacts of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.
		<u>Operation</u> <ul style="list-style-type: none"> Minor traffic impacts along access routes as a result of treatment plant operation and maintenance. Minimal impacts to freight, transit, bicycle, and pedestrian traffic. Transportation impacts less likely than would occur with alternative development at treatment plant sites. 	<u>Operation</u> <ul style="list-style-type: none"> King County would work with local agencies to identify any necessary site-specific traffic mitigation measures in addition to applicable development regulations. Trucks would use designated truck routes. Routes for delivery of chemicals and biosolids would be designated during the permitting phase. Construction and operation impacts of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Common to All Systems (cont.)	Conveyance	<u>Construction</u> <ul style="list-style-type: none"> Heavy construction, such as major earthwork excavation, would create the greatest traffic impacts. Expected to last generally 1 to 4 years, varying by portal site. Daily and peak-hour traffic for primary portal construction varies by portal siting area. Some intersections experience LOS reduction. Construction traffic for secondary portals, if needed, estimated at 3 trucks per day; little impact expected. 	<u>Construction</u> <ul style="list-style-type: none"> Develop comprehensive TMP with same elements described above for Treatment Plant. Temporary mitigation measures proposed for key impacted intersections, including: temporary adjustments to traffic signals, flagger for traffic control, and/or temporary striping changes to restore no action LOS. Temporary mitigation measures along construction access routes were identified to monitor impacts associated with pavement conditions, non-motorized facilities, and on-street parking. Construction and operation impacts of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.
		<u>Operation</u> <ul style="list-style-type: none"> Operational impacts limited to periodic maintenance checks, several times a week for primary portals. Secondary portals would incur approx. one maintenance visit per year. Traffic impacts not expected. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation required.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Common to All Systems (cont.)	Outfall	<u>Construction</u> <ul style="list-style-type: none"> Proposed outfall alignments would not extend into marine traffic lanes, but construction methods may require floating anchor lines and pipelines into position. Commercial and recreational maritime traffic would have to navigate around construction vessels and their anchors. Tugs and barges may temporarily enter or cross maritime traffic lanes. Potential impacts to land traffic system would be related mainly to greater traffic volume due to removal of excavated materials and pipeline material delivery. 	<u>Construction</u> <ul style="list-style-type: none"> Minimize delivery or removal of materials from construction sites during peak traffic periods, and use designated maritime traffic lanes and truck traffic routes. Coordinate construction activities with WSDOT, marina, tribal, commercial, and other officials to reduce interference with marine and land transportation systems. Mark and light offshore construction vessels per applicable U.S. Coast Guard regulations to alert operators of other vessels to their presence and operating status. Construction and operation impacts of Brightwater will also be subject to and mitigated by applicable local, state, and federal regulatory requirements.
		<u>Operation</u> <ul style="list-style-type: none"> Normal operation of the marine outfall would not impact marine or land transportation. There will be no above-water or near-surface structures that could impact vessel traffic. Regular maintenance and inspection would not require equipment that would impact marine transportation. 	<u>Operation</u> <ul style="list-style-type: none"> Design the outfall in consultation with tribal and commercial fishers to minimize the potential for gear and anchor line entanglement. Mark and light vessels involved in the periodic inspection of the outfall pipeline per applicable U.S. Coast Guard regulations to alert operators of other vessels to their presence and operating status.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Route 9–195th Street System	Treatment Plant	<u>Construction</u> <ul style="list-style-type: none"> Peak construction traffic would increase total daily traffic approx. 1.5% on SR-9 north of SR-522. No changes in roadway segment LOS compared with No Action Alternative. Slightly longer delays, but no LOS changes, at most intersections on access routes. The LOS at the SR-9 and 228th Street SE intersection would decline in LOS from D to F. The LOS at the SR-9 and SR-522 Eastbound ramps intersection would decline in LOS from D to E. Minimal impacts to bicycle, pedestrian, transit, and freight traffic. Concurrent construction of SR-9 capacity improvements would create significant adverse effects to LOS at certain segments and intersections. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Treatment Plant under Measures Common to All. Manage peak-hour construction traffic from the Route 9 site so it is no worse than "no-action" by one of the following means. King County could: <ul style="list-style-type: none"> Coordinate with WSDOT to expedite the SR-9 road construction to minimize or eliminate the overlap with Brightwater construction; or Revise the timing of its traffic uses associated with Brightwater construction to the extent practicable to reduce the conflict; or Limit or reduce vehicle traffic access to the site during peak periods to the extent practicable and possible, given the paramount need of having Brightwater constructed and operating by 2010. Temporary mitigation was developed to address deficiencies during construction at: SR-9/228th, SR-9/SR-522 Eastbound ramps, and SR-9/SR-524. Proposed mitigation includes adjustments to the traffic signal system at the intersections.
		<u>Operation</u> <ul style="list-style-type: none"> Trips generated by the plant in both 2010 (36 mgd) and 2040 (54 mgd) result in net decrease in traffic due to displacement of existing businesses at the site (averaging approximately 155 trips fewer than No Action Alternative). LOS expected to remain the same as or better than No Action Alternative. 	<u>Operation</u> <ul style="list-style-type: none"> Potential channelization and traffic control improvements were developed for 2040 operations to address background infrastructure deficiencies not caused by Brightwater traffic at 228th St SE/SR-9, SR-527/228th St SW, SR-9/SR-522, and SR-9/SR-522 WB ramps.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Route 9–195th Street System (cont.)	Conveyance	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. Also, temporary mitigation proposed at the following intersections: SR-104/15th Ave NE, SR-522/SR-527, SR-522/68th Ave NE, N 185th St/SR-99, NE 195th St/120th Ave NE, NE 195th St/North Creek Parkway, 80th Ave NE/NE 195th St, SR-9/228th, SR-9/SR-522 Eastbound ramps, SR-9/SR-524, and Beardslee Blvd/Ross Rd. Proposed mitigation includes adjustments to the traffic signal system, flagger control, and/or channelization changes at the intersections. Also, temporary mitigation proposed along the following construction access routes: SR-522, NE 175th Street, 80th Avenue NE, NE 195th Street, 15th Avenue NE, SR-99, NW 196th Street, and Richmond Beach Drive. Temporary mitigation measures along construction access routes were identified to monitor impacts associated with pavement conditions, non-motorized facilities, and on-street parking. Also, potential for co-use of Chevron Richmond Beach Asphalt Terminal for construction. If feasible, may be considered to ease construction traffic at Portal 19.
		<u>Operation</u> <ul style="list-style-type: none"> Generally the same as described above for Treatment Plant under Measures Common to All. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation required.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Route 9–195th Street System (cont.)	Outfall	<u>Construction</u> <ul style="list-style-type: none"> Activity would occur near Chevron Richmond Beach Asphalt Terminal at Point Wells. Construction vessel traffic would be coordinated with vessels using the Chevron Richmond Beach Asphalt Terminal and is not expected to significantly impact the dock's commercial activities. Recreational water activities, such as fishing derbies or yacht races, would likely be relocated during construction. Onshore trench construction estimated at 1-2 months (22 to 46 truck trips per day). Pipe segments and backfill materials would be delivered over 2-3 months (15 to 23 trucks trips per day). Nearshore trench construction is 2-3 months (4 to 7 barge trips per month). Backfill and pipeline delivery would require 4 to 7 barge trips. 	<u>Construction</u> <ul style="list-style-type: none"> Coordinate construction vessel traffic and activities with ChevronTexaco and tribal officials to reduce interference with Chevron dock operations and tribal fishing. Follow truck traffic mitigation measures as described for Portal 19 construction.
		<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Outfall under Measures Common to All. 	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Outfall under Measures Common to All.
Route 9–228th Street System	Treatment Plant	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Treatment Plant under Measures Common to All and Route 9–195th Street Corridor.
		<u>Operation</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor. 	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Route 9–228th Street System (cont.)	Conveyance	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. Also, temporary mitigation proposed at the following intersections: SR-522/SR-527, SR-522/68th Ave NE, N 185th St/SR-99, NE 195th St/120th Ave NE, NE 195th St/North Creek Parkway, 80th Ave NE/NE 195th St, SR-9/228th St, SR-9/SR-522 Eastbound ramps, SR-9/SR-524, and Beardslee Blvd/Ross Rd. Proposed mitigation includes adjustments to the traffic signal system, flagger control, and/or channelization changes at the intersection. Also, temporary mitigation proposed along the following construction access routes: SR-522, NE 175th Street, 80th Avenue NE, NE 195th Street, 228th Street SW, 224th Street SW, Locust Way, 73rd Avenue W, SR-99, NW 196th Street, and Richmond Beach Drive NW. Temporary mitigation measures along construction access routes were identified to monitor impacts associated with pavement conditions, non-motorized facilities, and on-street parking. Also, potential for co-use of Chevron Richmond Beach Asphalt Terminal dock for construction. If feasible, may be evaluated as a mitigation measure to ease construction traffic at Portal 19.
		<u>Operation</u> <ul style="list-style-type: none"> Generally the same as described above for Conveyance under Measures Common to All. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation required.
	Outfall	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Route 9–228th Street System (cont.)	Outfall	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Outfall under Measures Common to All. 	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for the Route 9 site with the 195th Street corridor.
		<u>Construction</u> <ul style="list-style-type: none"> Need to realign Pine St to the south to maintain access during construction. Would not change any existing LOS. Offsite parking for construction workers, along with shuttle service to the site. Analyses have identified 3 potential locations: two near I-5/SR-104 interchange, and one along 236th St SW near SR-99. Peak construction activities would increase peak-hour and daily traffic approximately 4% on SR-104 west of SR-99. Roadway segment LOS expected to stay generally same as No Action Alternative. Slightly longer delays at intersections. LOS would drop at SR-104/100th Ave W, SR-104/I-5 SB ramps, and SR-104/15th Ave NE. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Treatment Plant under Measures Common to All. Also use shuttle buses to bring workers to the site from a remote parking location, to reduce traffic delays along SR-104 and local streets. Additional off-site parking and shuttles may be required with the Unocal Structural Lid sub-alternative.
Unocal System	Treatment Plant	<ul style="list-style-type: none"> Queuing left-turning trucks on westbound SR-104 at Pine St may exceed existing p.m. peak-hour storage capacity. Pedestrian and bicycle access may occasionally be impeded by construction traffic. Combining the Brightwater and Edmonds Crossing project at the site would increase construction related traffic impacts at the site. An alternative is being considered that would place a structural lid over the treatment plant at the Unocal site to accommodate the Edmonds Crossing project. If this alternative were to be selected, the peak construction of the structural lid with the treatment plant would require 442 more construction workers than the peak construction of the treatment plant by itself. As a result, the intersection and roadway impacts would be greater surrounding the candidate parking sites. 	<ul style="list-style-type: none"> Also consider these actions; provide truck queuing storage along SR-104 and onsite; extend left turn lane at SR-104/Pine St intersection to provide additional northbound turn storage; and synchronize all construction traffic entering and leaving the Unocal site with ferry operations. Also, temporary mitigation, including flagger control, signal and/or striping changes, was developed to address deficiencies during construction at six intersections: SR-104/15th NE, SR-522/SR-527, SR-522/68th Ave NE, SR-104/100th Ave W, SR-104/232nd St. SW. and SR-104/Pine St. Maintain access between Edmonds and Woodway for emergency vehicles at all times during the construction and realignment of Pine Street.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Unocal System (cont.)	Treatment Plant (cont.)	<u>Operation</u> <ul style="list-style-type: none"> Trips generated by the plant in both 2010 (36 mgd) and 2040 (54 mgd or 72 mgd) operations increase traffic in the p.m. peak hour approximately 44, 60, and 82 trips respectively. LOS would generally be the same as under the No Action Alternative; but the Edmonds Way/Dayton St intersection would see a drop in LOS under the 54 mgd with Edmonds Crossing sub-alternative. Minimal or no impact on ferry, freight, transit, bicycle, and pedestrian traffic. 	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Treatment Plant under Measures Common to All. Also, potential traffic signal and channelization improvements for 2010 operations were developed to address background infrastructure deficiencies not due to Brightwater at three intersections: Edmonds Way/100th Ave W, SR-104/SR-522, SR-522/SR-527. Potential improvements for 2040 operations (both 54 mgd and 72 mgd) include the above intersections and SR-99/244th St SW, I-5 SB offramp/244th St SW, and 15th Ave NE/ Ballinger Way/244th S. Potential improvements for the 2040 54-mgd with Edmonds Crossing include all the above and Edmonds Way/Dayton Street. Proposed improvements would address operational deficiencies created by the proposed project-related traffic.
	Conveyance	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. 	<u>Construction</u> <ul style="list-style-type: none"> Same as described above for Conveyance under Measures Common to All. Also, temporary mitigation proposed at the following intersections: SR-104/15th NE, SR-522/SR-527, SR-522/68th Ave NE, SR-104/Pine St, SR-104/100th Ave W, SR-104/232nd St SW, NE 195th St/North Creek Parkway, NE 180th St/132nd Ave NE, and 80th Ave NE/SR-522. Also, temporary mitigation proposed along the following construction access routes: NE 175th Street, SR-104, 25th Avenue NE, 232nd Street SW, and 92nd Avenue W. Temporary mitigation measures along construction access routes were identified to monitor impacts associated with pavement conditions, non-motorized facilities, and on-street parking.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
Unocal System (cont.)	Conveyance (cont.)	<u>Operation</u> <ul style="list-style-type: none"> Generally same as described above for Conveyance under Measures Common to All. Additional support structures may be located at Portals 14, 11, and 7. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation required.
	Outfall	<u>Construction</u> <ul style="list-style-type: none"> Activity would occur near Edmonds Marina, tribal fishing areas, Unocal dock, and Edmonds Terminal. An underwater sea park is located approximately 1.25 miles north. Barges for potential marine disposal of excavated material are not expected to significantly impact access to these areas or marine traffic in or near Zone 6. Onshore trench construction estimated at 1-2 months (13 to 27 truck trips per day). Pipe segments and backfill materials would be delivered over 2-3 months (8 to 12 truck trips per day). Nearshore trench construction is 2-3 months (6 to 9 barge trips per month). Backfill and pipeline delivery would require 6 to 9 barge trips. Ferries may have to deviate slightly from normal routes. Recreational water activities near Zone 6 (fishing derbies, yacht races) would likely be relocated during construction. 	<u>Construction</u> <ul style="list-style-type: none"> Coordinate construction vessel traffic with WSDOT to minimize impacts to scheduled ferry service. Coordinate construction activities with marina and tribal officials to reduce interference with fishing and recreational boating. Follow truck traffic mitigation measures as described for plant construction.
		<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Outfall under Measures Common to All. 	<u>Operation</u> <ul style="list-style-type: none"> Same as described above for Outfall under Measures Common to All.
		<u>Construction</u> <ul style="list-style-type: none"> No construction-related impacts associated with the Brightwater project would occur. 	<u>Construction</u> <ul style="list-style-type: none"> No mitigation is proposed.
No Action Alternative	Treatment Plant	<u>Operation</u> <ul style="list-style-type: none"> No impacts associated with Brightwater would occur. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation is proposed.

Table 16-69. Summary of Impacts and Mitigation Measures—Transportation (cont.)

Brightwater System	System Component	Impacts	Mitigation
No Action Alternative (cont.)	Conveyance	<u>Construction</u> <ul style="list-style-type: none"> No construction-related impacts associated with construction of Brightwater conveyance facilities would occur. 	<u>Construction</u> <ul style="list-style-type: none"> No mitigation is proposed.
		<u>Operation</u> <ul style="list-style-type: none"> No impacts associated with operation of Brightwater conveyance facilities would occur. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation is proposed.
	Outfall	<u>Construction</u> <ul style="list-style-type: none"> There would be no impacts to transportation systems. 	<u>Construction</u> <ul style="list-style-type: none"> No mitigation is proposed.
		<u>Operation</u> <ul style="list-style-type: none"> There would be no impacts to transportation systems. 	<u>Operation</u> <ul style="list-style-type: none"> No mitigation is proposed.

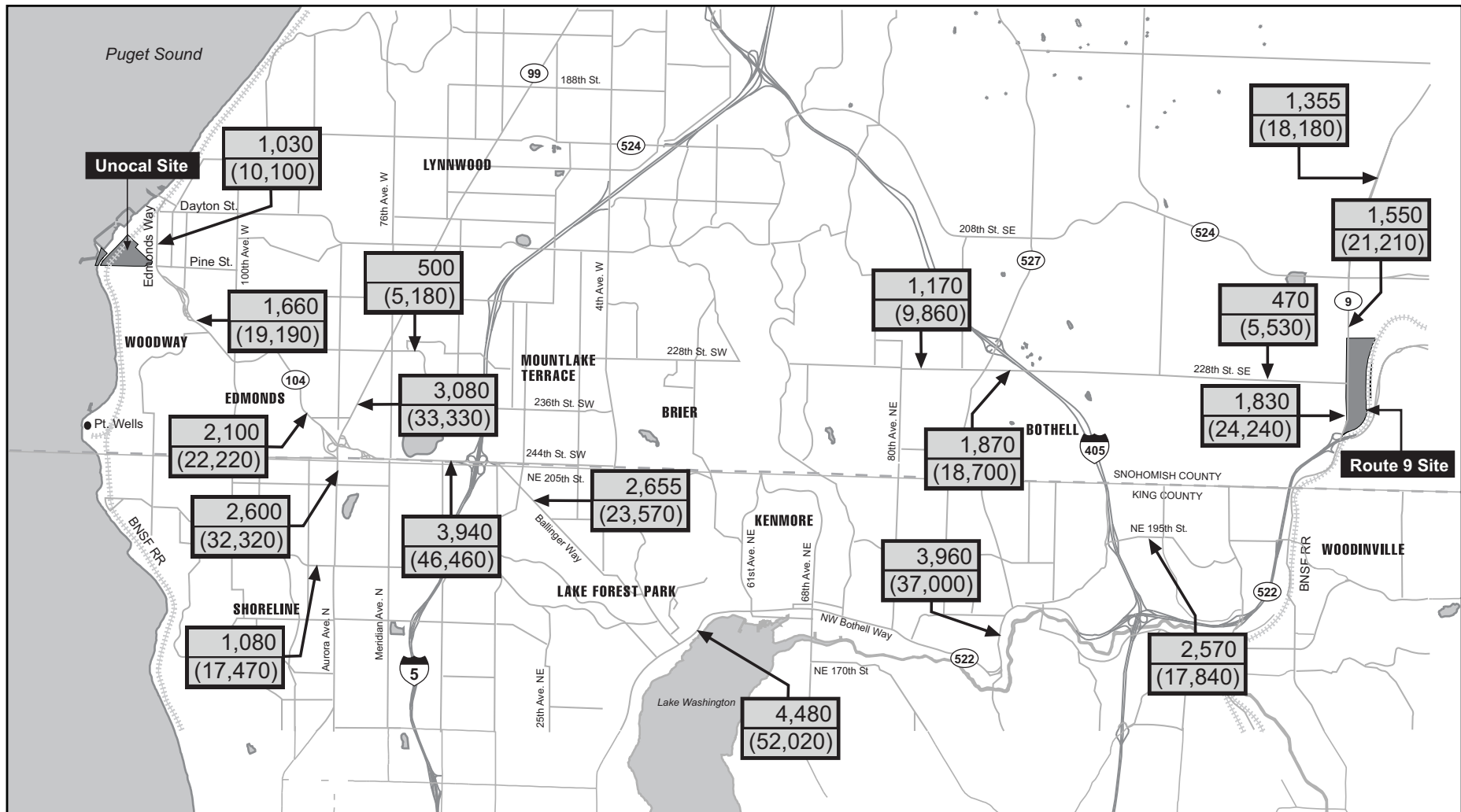
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Treatment Plant



1,200
(24,500)
PM Peak-Hour Traffic Volume
Daily Traffic Volume



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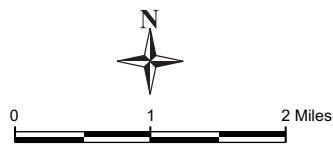
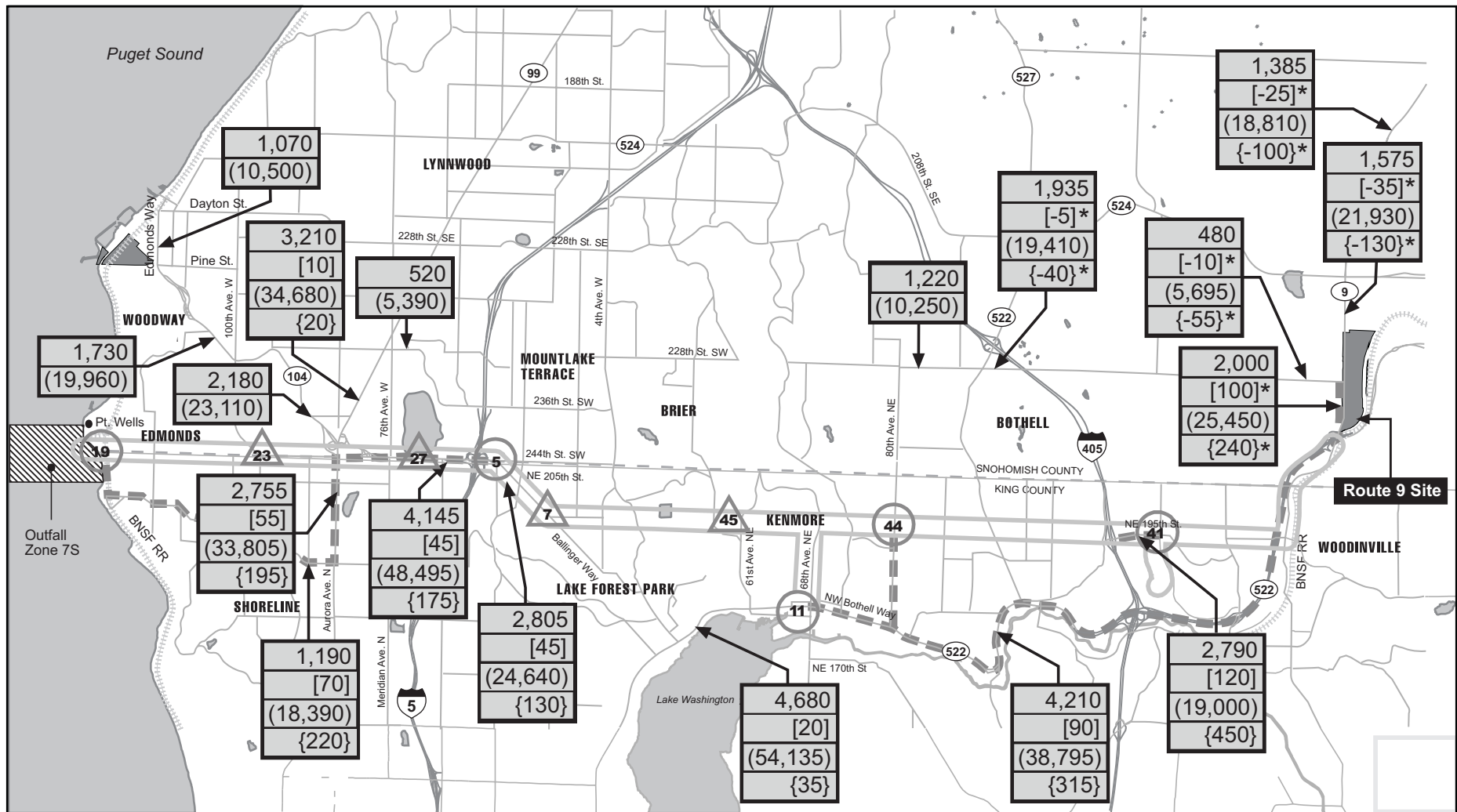
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Traffic Conditions • 9/22/03 • gm/gr/lw (u)

Figure 16-1

Existing Traffic Conditions

BRIGHTWATER FINAL EIS



- 14** Primary Portal
- 7** Secondary Portal
- Route 9 195th Corridor

- Proposed Construction Truck Access Route
- Treatment Plant Site
- Outfall Zone

- 1,200 PM Peak-Hour Traffic Volume
- [10] PM Peak-Hour Brightwater Construction Traffic Volume
- (24,500) Daily Traffic Volume
- {100} Daily Brightwater Construction Traffic Volume

* Total represents Brightwater project trips minus existing trips removed due to the displacement of current land uses.



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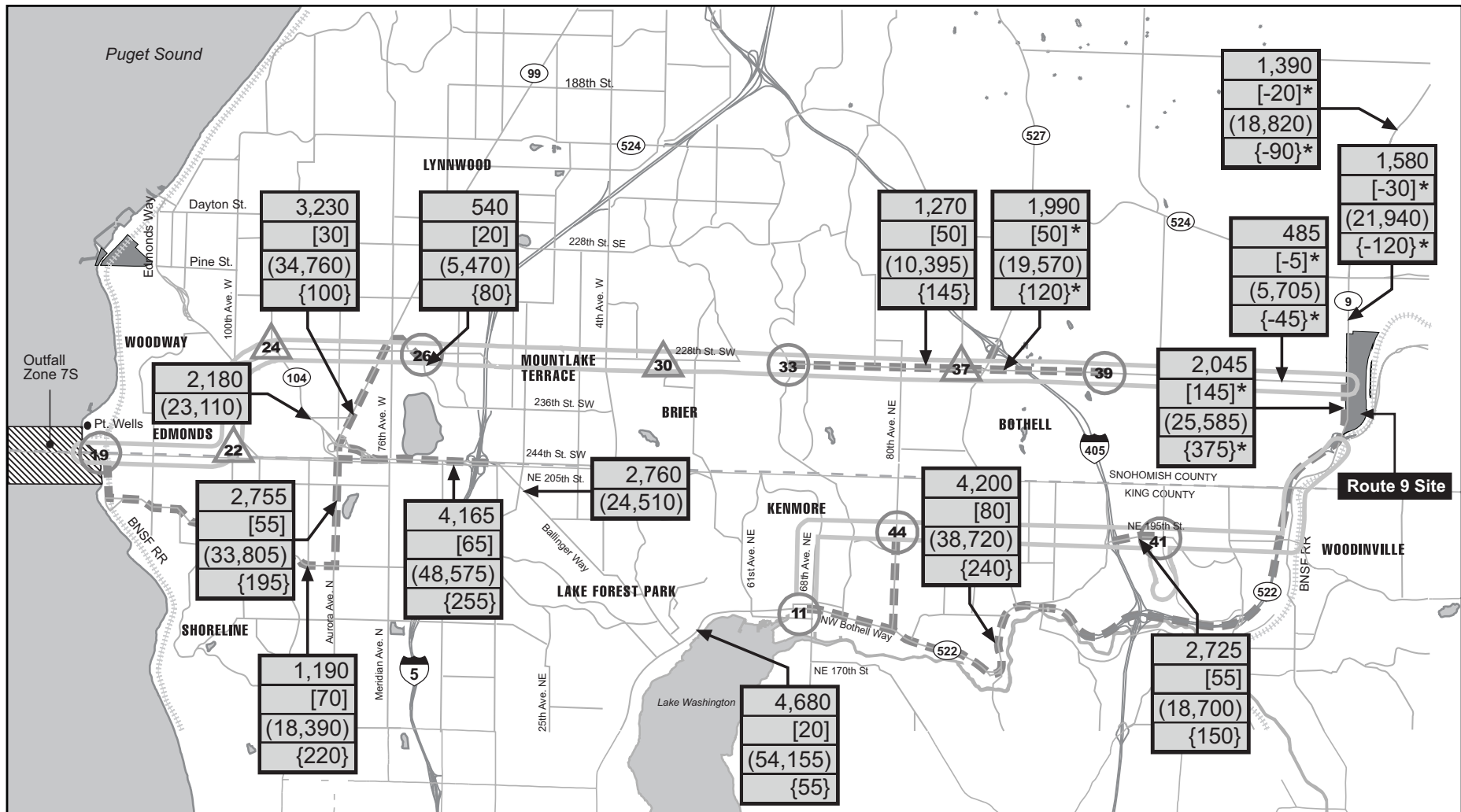
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Figure 16-2
2007 Construction Traffic Conditions
Route 9 – 195th Street Corridor
BRIGHTWATER FINAL EIS



-  Primary Portal
-  Secondary Portal
-  Route 9 228th Corridor

-  Proposed Construction Truck Access Route
-  Treatment Plant Site
-  Outfall Zone

1,200	PM Peak-Hour Traffic Volume
[10]	PM Peak-Hour Brightwater Construction Traffic Volume
(24,500)	Daily Traffic Volume
{100}	Daily Brightwater Construction Traffic Volume

* Total represents Brightwater project trips minus existing trips removed due to the displacement of current land uses.



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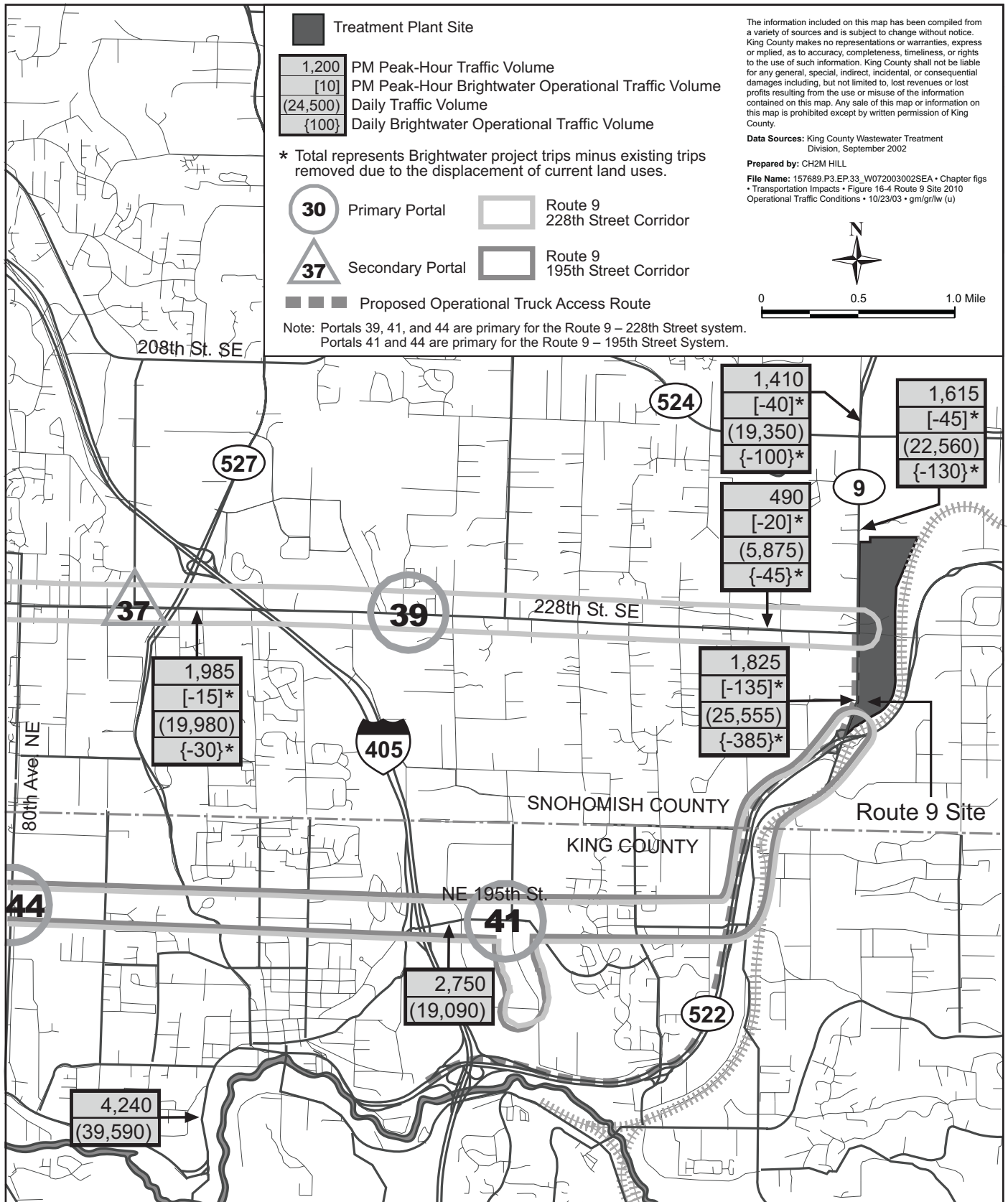
Data Sources: King County Wastewater Treatment Division, September 2002

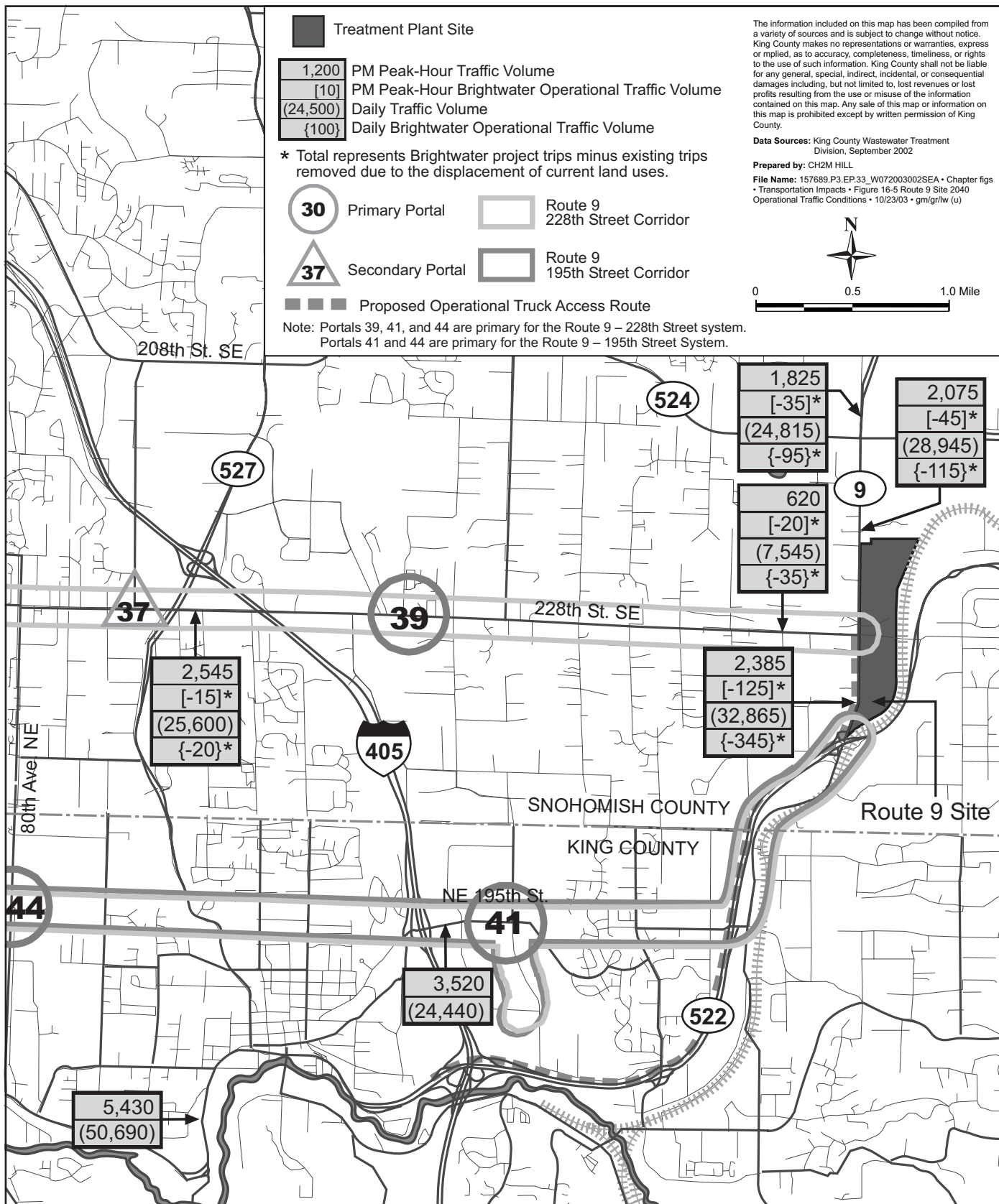
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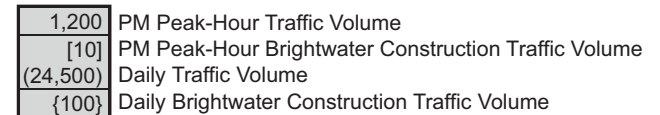
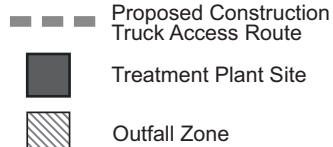
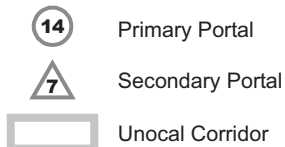
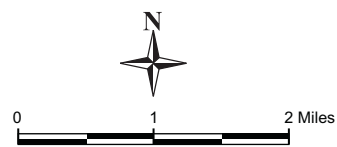
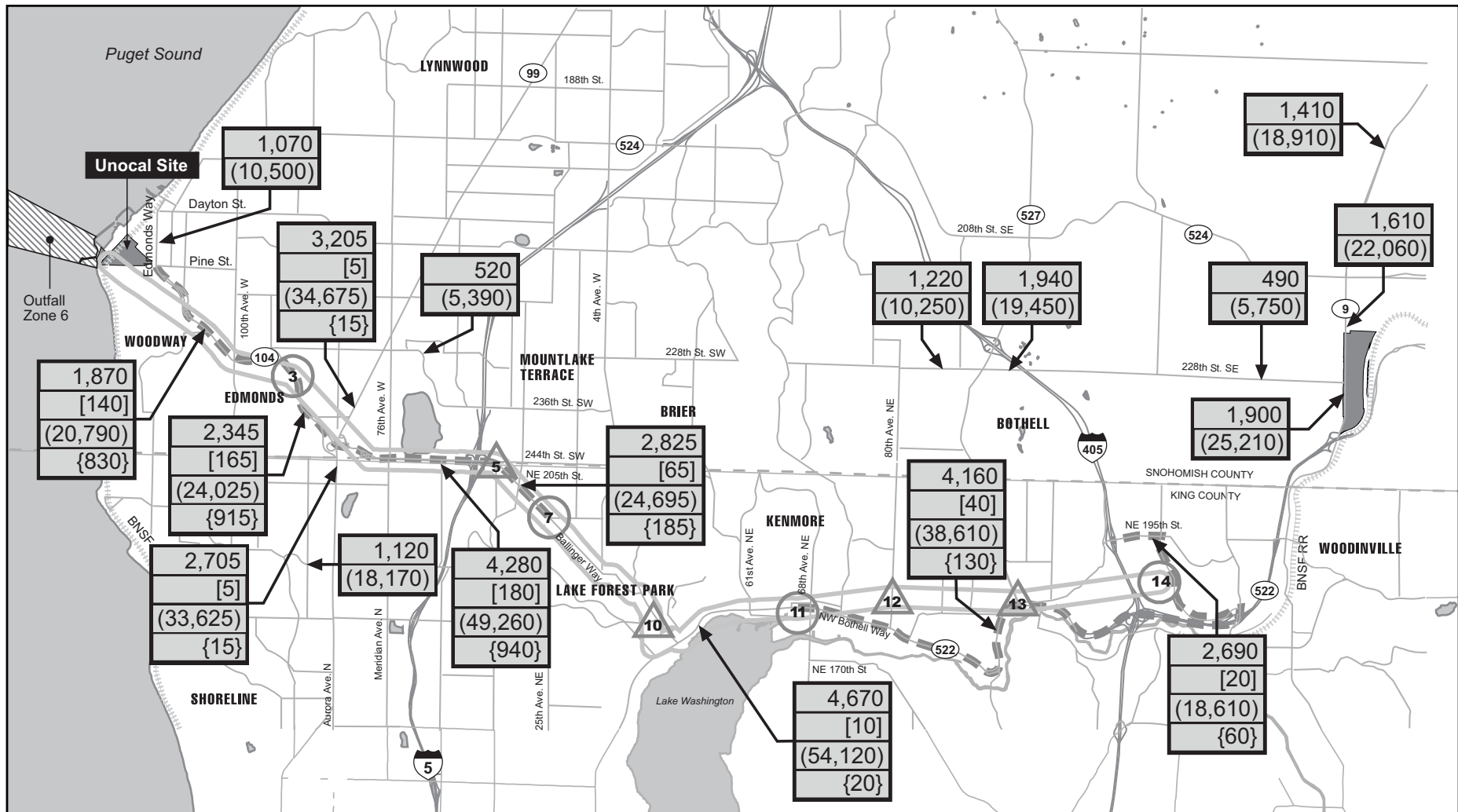
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Figure 16-3_Route 9 228th Corridor 2007 Construction Traffic Conditions • 10/23/03 • gm/gr/w (u)

Figure 16-3
**2007 Construction Traffic Conditions
Route 9 – 228th Street Corridor**

BRIGHTWATER FINAL EIS







Note: Portal 11 is a primary portal and pump station for the Unocal system.

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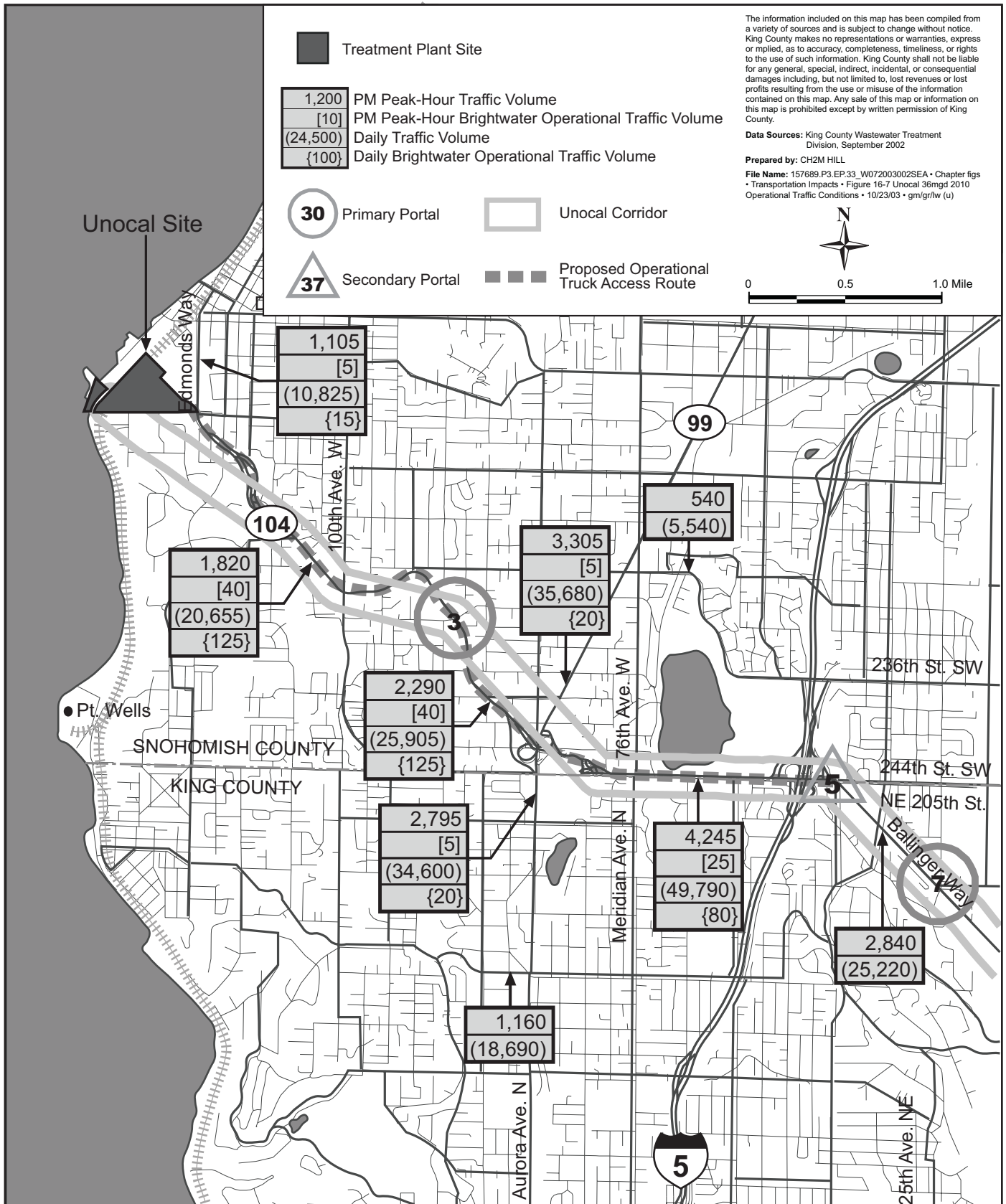


Figure 16-7

36-mgd Treatment Plant 2010 Operational Traffic Conditions – Unocal Site BRIGHTWATER FINAL EIS

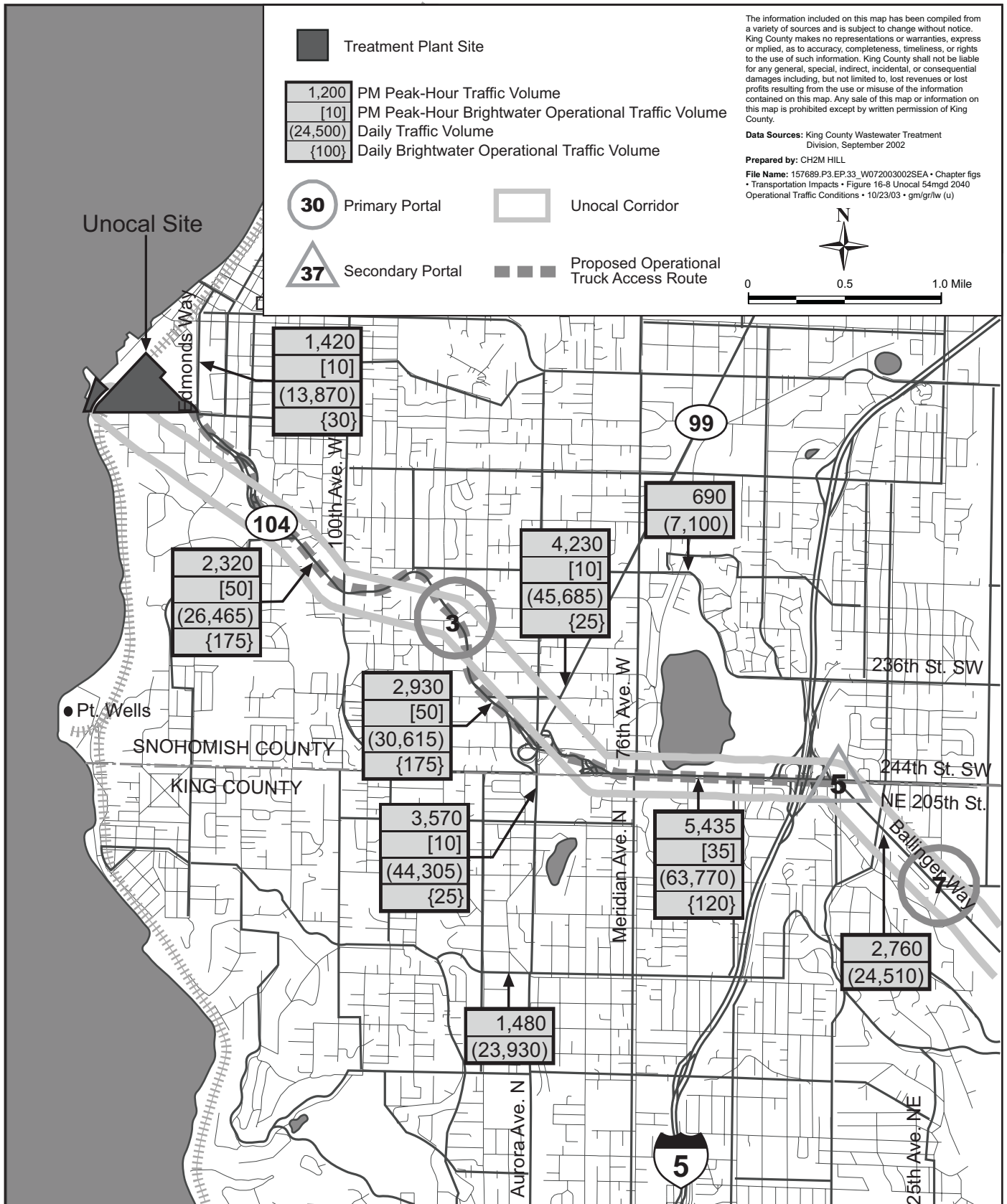


Figure 16-8

54-mgd Treatment Plant
2040 Operational Traffic Conditions – Unocal Site
BRIGHTWATER FINAL EIS

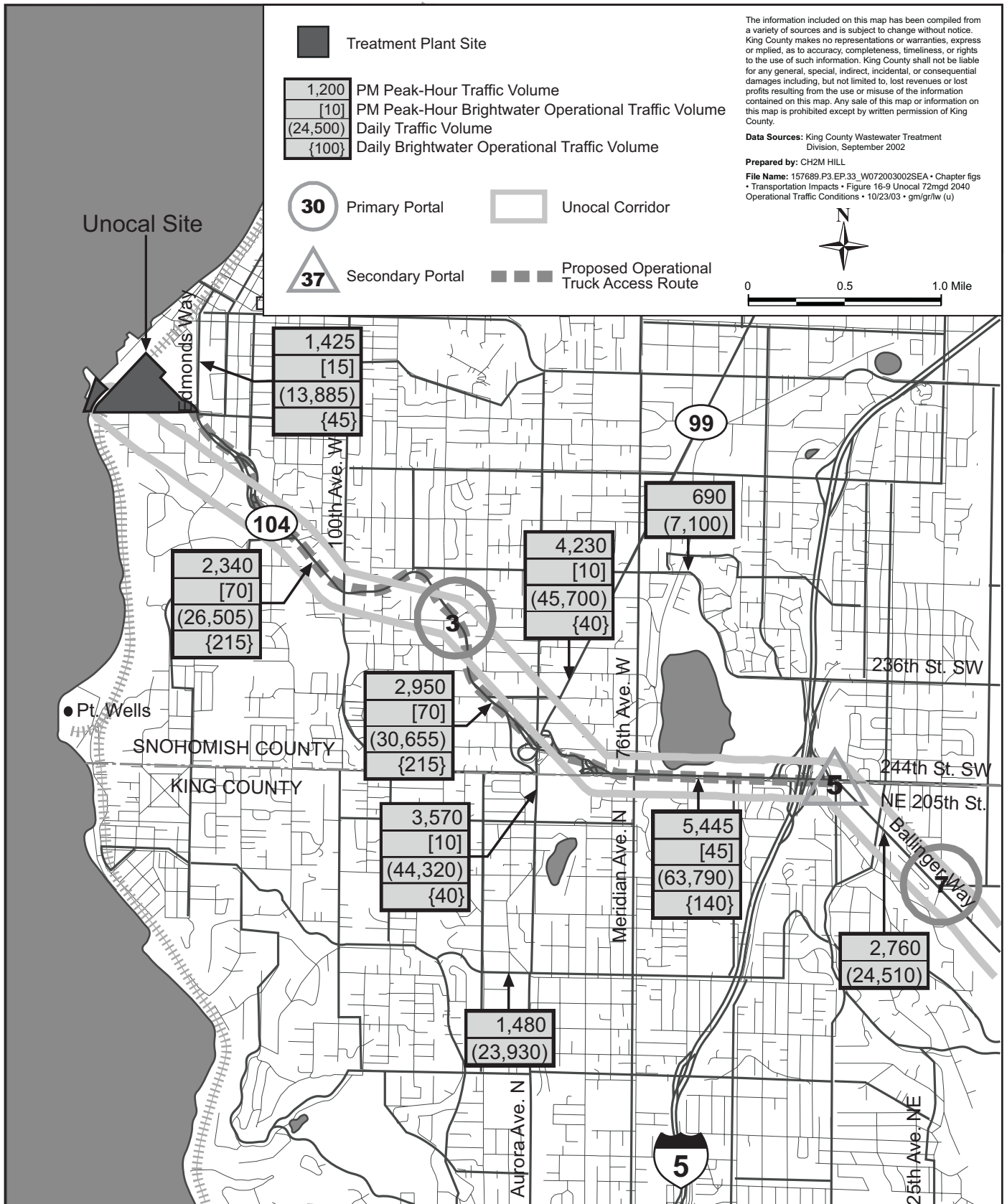


Figure 16-9

72-mgd Treatment Plant
2040 Operational Traffic Conditions – Unocal Site
BRIGHTWATER FINAL EIS

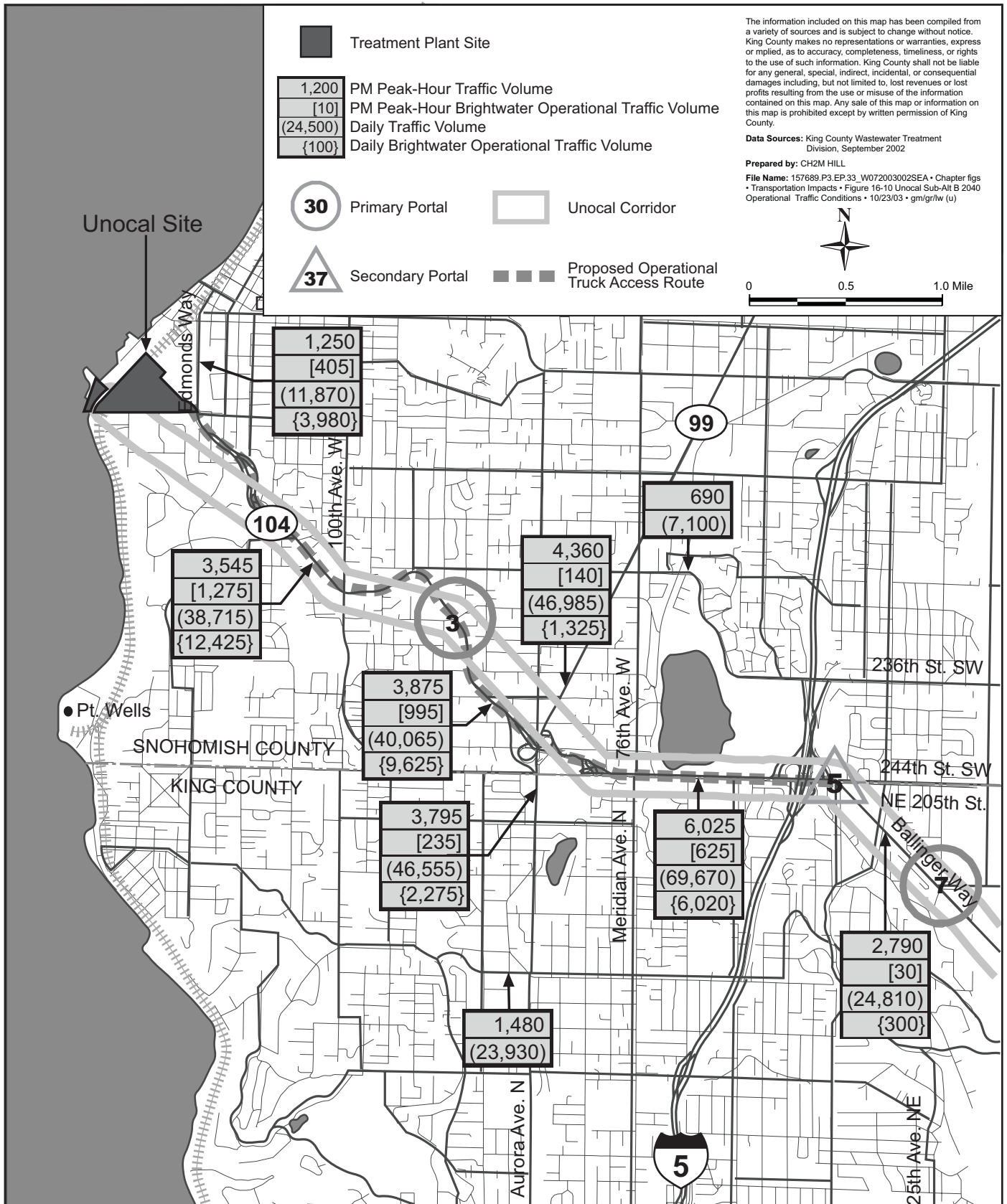
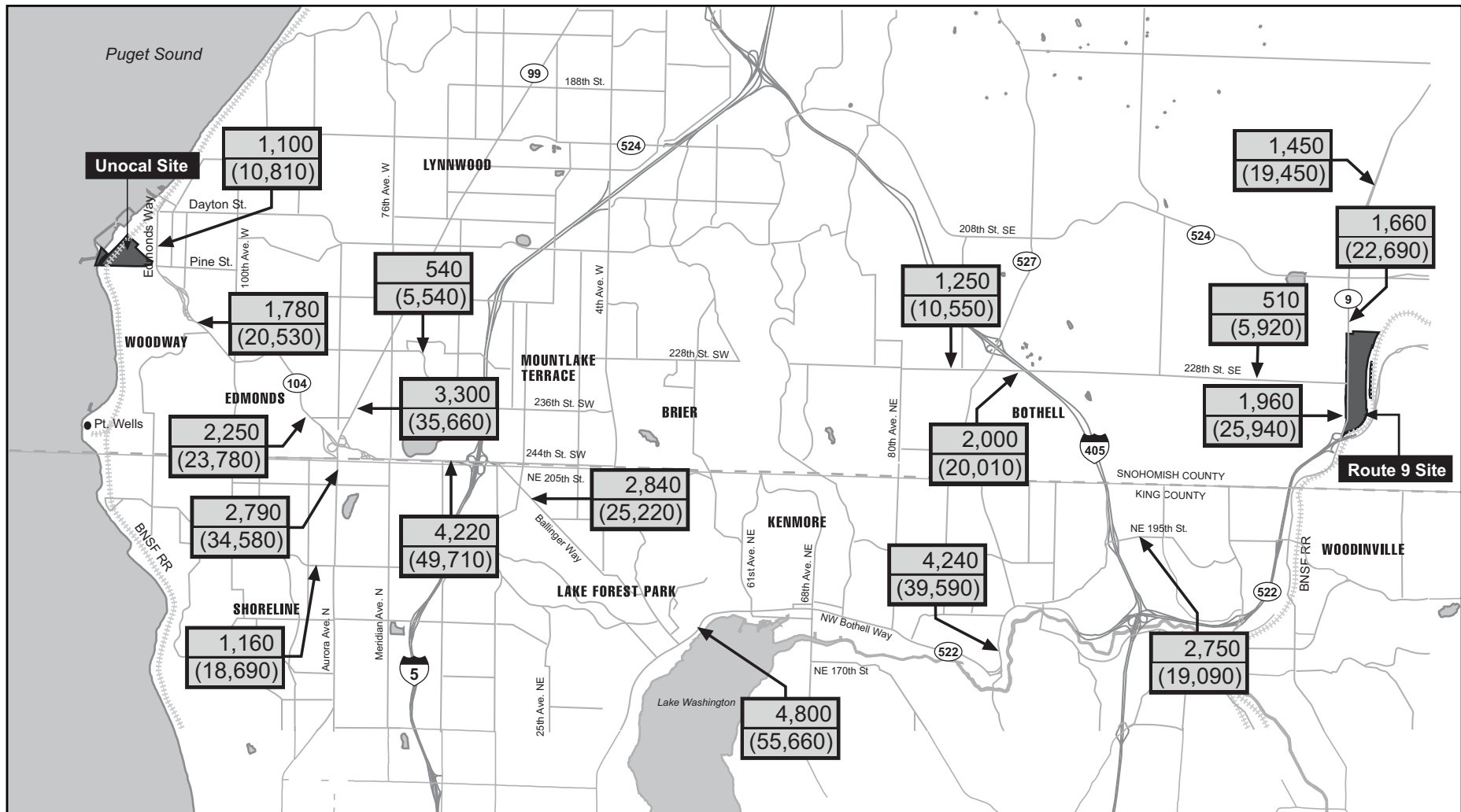


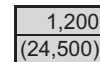
Figure 16-10

**2040 Operational Traffic Conditions Unocal Site
Structural Lid With Edmonds Crossing Multimodal Center**

BRIGHTWATER FINAL EIS



Treatment Plant Site



PM Peak-Hour Traffic Volume
Daily Traffic Volume



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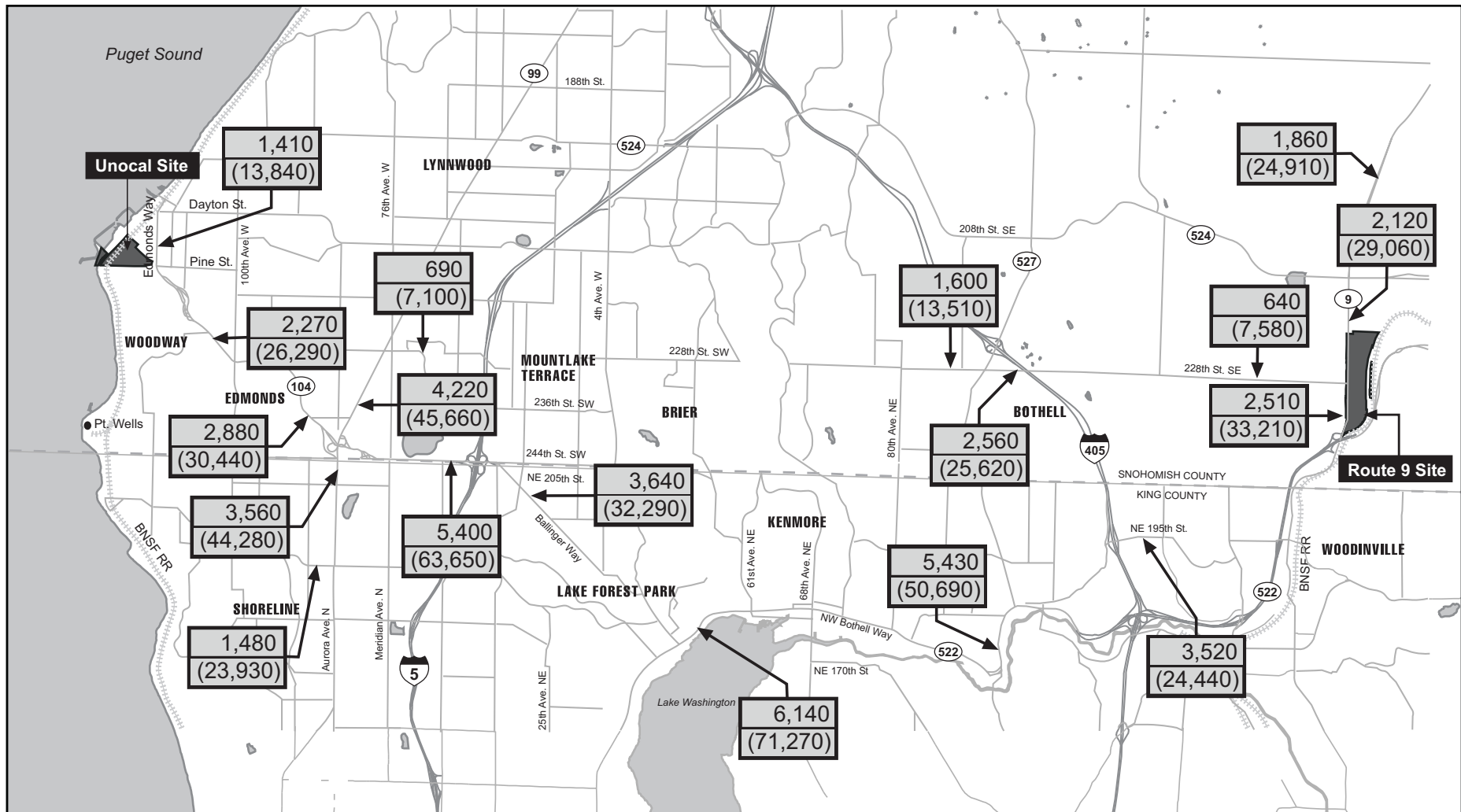
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No Action_2010_Traffic • 9/23/03 • gm/gr/lw (u)

Figure 16-11

**No Action Alternative
2010 Traffic Conditions**

BRIGHTWATER FINAL EIS



Treatment Plant Site

1,200
(24,500) PM Peak-Hour Traffic Volume
Daily Traffic Volume



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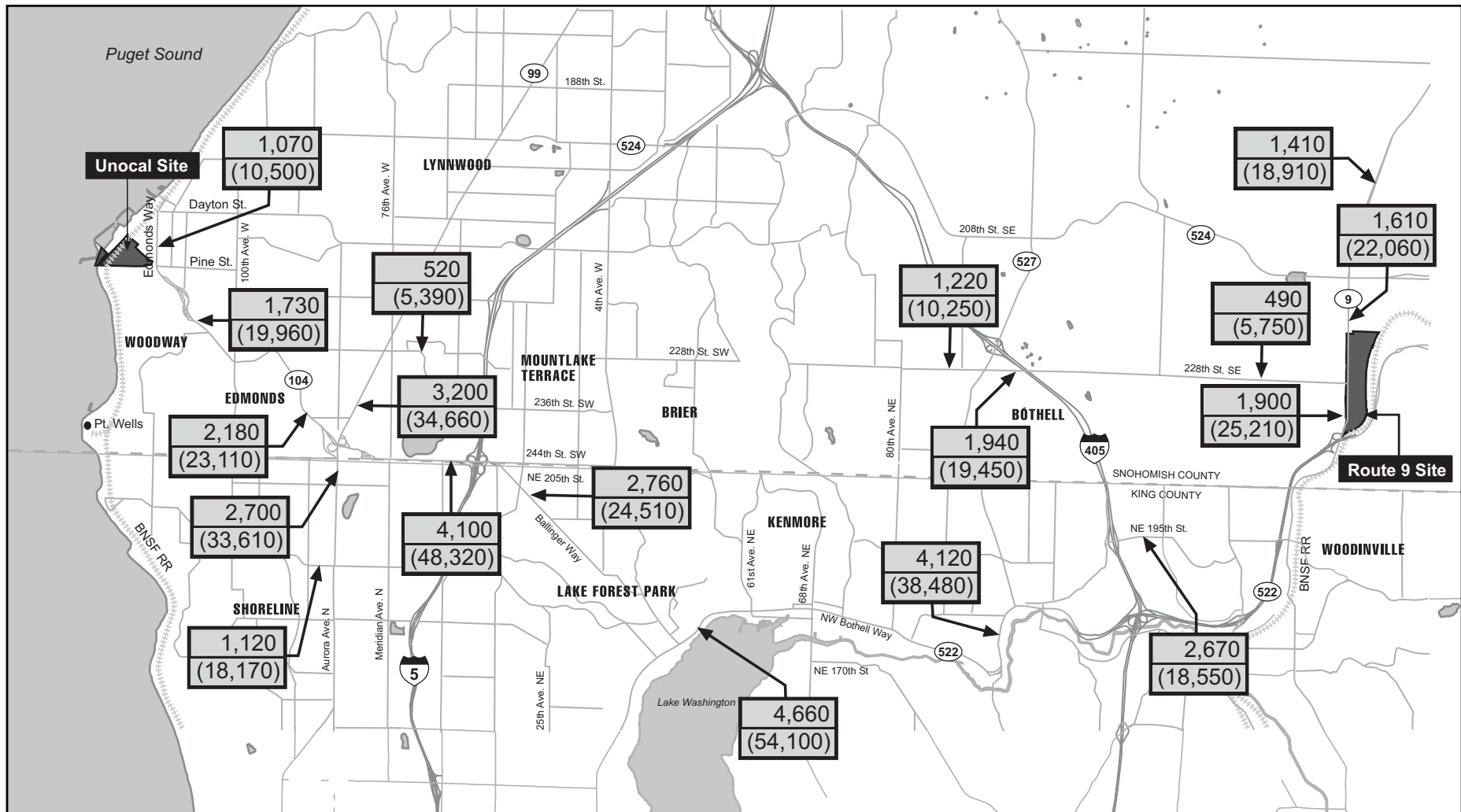
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Figure 16-12

**No Action Alternative
2040 Traffic Conditions**

BRIGHTWATER FINAL EIS



Treatment Plant Site

1,200 PM Peak-Hour Traffic Volume
(24,500) Daily Traffic Volume